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THE EXPERIENCE GRADING AND RATING SCHEDULE

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EDITION

E. G. Richards



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THE EXPERIENCE
GRADING AND RATING SCHEDULE

BY THE SAME AUTHOR

A TOPICAL ESSAY—1908

An address before the Fire Underwriters
Association of the Northwest—Chicago

CLASSIFICATION—DISCRIMINATION—1913

An address before the Insurance Society of
New York

**THE EXPERIENCE GRADING AND RATING
SCHEDULE—1915 (*First Edition*)**

**WHY I BELIEVE IN RATE-MAKING FROM
CLASSIFIED EXPERIENCE—1916**

An address before the Insurance Library
Association—Boston

THE EXPERIENCE GRADING AND RATING SCHEDULE

A SYSTEM OF
FIRE INSURANCE RATE-MAKING
BASED UPON
AVERAGE FIRE COSTS

BY
E. G. ^{Gray} _{11/15} RICHARDS, 1

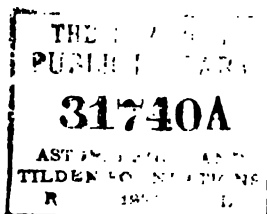
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PREFACE

The purpose of this work is to stimulate further thought and discussion upon the subject of rate-making from experience. Shall present methods of estimating fire insurance rates continue, or may they not preferably be computed from actual costs?

There is a growing belief that the rate-making of the fire insurance companies will be placed upon a scientifically correct basis by following the latter course, and thus be as far removed from estimate or conjecture as are the mortality tables of the life insurance companies.

To determine just rates from actual experience appeals to both imagination and judgment even though the route be new and untried. The author believes that as between the two methods there is every reason why the experience plan should be given preference.

Probably no part of the world is so well adapted to an experimental test of a rate-making plan founded upon experience as is the United States because of its size, its varied conditions, climatic and ethnological, and of the fact that it is the largest premium-producing country in the world.

The National Board of Fire Underwriters is the only existing organization in the United States that could standardize, as well as nationalize, a rate-making system.

The total value of property in the United States subject to fire damage is estimated to be at least two hundred billions of dollars (\$200,000,000,000); that upon those vast property values insurance against fire is carried to an approximate amount of one hundred twenty-five billion dollars (\$125,000,000,000). For this protection the public in 1920 paid in premiums nine hundred million dollars (\$900,000,000) or more (actual figures not available), of which nearly or

San Francisco - Nov. 10/21.

quite seven hundred million dollars (\$700,000,000) were paid to the stock fire insurance companies. The rates of insurance charged the public which produced this enormous sum of premiums were simply estimates and were not evolved from the actual costs of the business because the details of those costs were unknown.

The need for some system of rate-making founded upon the combined classified experience of the fire insurance companies by which the correctness of rates may be demonstrated, is acknowledged. Fire underwriters have not as yet agreed upon a plan for so doing, but the belief is entertained by many that rate-making from actual costs is perfectly practicable and will be realized in the not distant future.

Since the Actuarial Bureau of the National Board of Fire Underwriters was established in 1915 the companies have been reporting their writings and losses in the United States to that bureau and are doing so at a very large expense, but to avoid burdensome requirements from state insurance departments for *state* experience (such information for a single state having no practical value), it seemed necessary for the companies to undertake the work and do in an orderly and well-considered manner that which otherwise might be forced upon them in some other form or in many conflicting ways. This vast statistical venture being now well established, it becomes a matter of extreme importance that upon the foundation so prepared shall be built a sound statistical system from which may be evolved fire insurance rates from actual costs.

Tables of experience will yield only an average fire-loss rate for the risks contained therein, and it is now impossible to obtain therefrom the costs of the elemental hazards which exist in each class; but there should be some way discovered for their separation.

At the time of the conferences in the spring of 1912 between the New York insurance department and the companies' committee with reference to the demand of the

department for combined classification, I entertained the firm belief—as for years before—that combined classified experience would have little or no value for the making of rates. Notwithstanding that belief, after thorough study during the following summer, I devised a plan for separating the costs of good risks from the poor by the grading of risks in each occupancy class according to quality, thereby determining the actual costs of inherent and exposure hazard. I then became convinced that a well-arranged classification system if thus extended would furnish the long-sought key to the problem of rate-making from underwriting experience in a manner scientifically correct. I was nevertheless confident that without such extension, combined classified experience would have little practical value. I am yet of that opinion.

If and when the underwriting experience of the companies now being contributed to the Actuarial Bureau is classified and graded in the manner herein set forth, and in due course of time that experience be so separated that the ratios of costs of inherent and exposure hazard become known for each separate class and grade, a great light will be thrown upon the science of fire underwriting, for such statistical knowledge will furnish a sure foundation for experience rate-making because the *true costs* of the basic elements of loss experience will have been discovered.

It would seem that by no other course can the cost of inherent and of internal and external exposure hazard be ascertained. The expenditure necessary for such accomplishment, however large, will be of little consequence compared with the results gained, and if the system becomes once established and made the sole rating system for the United States, the cost would be less than is now required for the maintenance of the various rate-making systems conducted by the rating bureaus scattered throughout the country.

The “Experience Grading and Rating Schedule” designed by the writer, which embodied the grading plan was com-

menced in 1912. The work of completion and the earlier work of the Actuarial Bureau Committee (of which the writer was then and until May, 1916, the chairman) were contemporaneous. The subject matter of the proposed rating system based upon combined experience was submitted from time to time to that committee. Though final action thereon was deferred it was by authority of the Executive Committee of the Board printed and given wide distribution. During the time that has since elapsed I have had opportunity for a further and more thorough study of the subject by reason of which this revision of the original work is now presented with the belief that it deserves the serious consideration of those interested in the subject of scientific rate-making. It certainly is true that some standard system of rate-making from combined underwriting experience is urgently needed by the fire underwriter and never so much as at the present time.

I am proposing a system of rate-making diametrically different from all other systems, but if fact is preferable to surmise and undisputed knowledge to be chosen rather than conjecture, then this system should supersede present methods, for it is founded upon the facts of recorded experience and will furnish that which the companies in 1913¹ in their brief to the Supreme Court of the United States *claimed* to possess, viz., "the training and information that enabled them to determine whether a rate as applied to any particular risk is or is not reasonable"!

Can the reasonableness of a rate be determined or even approximated while the cost of the service for which that rate is charged is unknown?

Finally, the predominant desire of the author has been and now is that from the discussions which have occurred or may ensue upon this subject, there will be developed a thoroughly scientific system of rate-making from recorded underwriting experience that will place the fire in-

¹ In re German Alliance vs. The State of Kansas.

PREFACE

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insurance business, with respect to its price-making, upon a basis of equality with every other world-wide business. If so, this work will have been a stepping-stone and possibly a final landing place to a standardized and nationalized system of Experience Rate-making.

E. G. RICHARDS.

530 West End Avenue,
New York City.
June 1st, 1921.

**THE
EXPERIENCE
GRADING AND
RATING SCHEDULE**

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INTRODUCTION

SYNOPSIS OF ARGUMENTS IN FAVOR OF THIS SYSTEM OF RATE-MAKING KNOWN AS THE EXPERI- ENCE GRADING AND RATING SCHEDULE

I. Rate-estimating unsatisfactory.

Present methods of fire insurance rate-making are complicated schedules of estimates, the operation of which few understand.

Experience rates, derived from basic costs and easily computed, should be given preference over every form of rate estimate. No other present system of rate-making but this will produce Experience Rates.

II. Adverse Legislation.

Experience Rate-making has long been in effect with life insurance companies and legislation for the regulation of their rates is unknown. State interference with fire insurance rates would similarly disappear when authorities were convinced that they were based on actual experience.

III. Basic Costs.

The basic elements of fire hazard consist of Inherent, Internal Exposure and External Exposure hazards. Their costs are unknown. By means of the Experience Grading and Rating System the cost of each, class by class, can be ascertained. Every insurance rate if correctly computed is composed of a part or all of these three basic elements, to which is added Expense and Profit.

IV. Conflagration Losses.

All such losses are included in the statistical records from which Experience rates are derived. No further charge for conflagration costs would be necessary.

V. Profit.

As state authorities insist upon some limitation of profit, any ratio of companies' profit agreed upon as equitable will

be automatically and correctly adjusted (1) as a whole, (2) among states and (3) upon each specific risk in its class.

VI. Other Hazards than Physical.

An effective means is furnished by this system of rate-making for discouraging carelessness and strictly preventable fires by giving moderate recognition in the rates of those parties responsible for such losses as shown by the records of the Actuarial Bureau of the National Board of Fire Underwriters, corresponding advantage being given to those free from loss record.

The financial standing of the assured becomes also a factor in his rate.

VII. Public Interest.

The public has the undoubted right to know the true costs of fire insurance indemnity and how rates are computed, since the U. S. Supreme Court declared that fire insurance "is clothed with a public interest" and affirmed the right of the state to regulate and control fire insurance rates.¹ Such true costs can only be found by an analysis of past experience.

VIII. Rate Adjustment.

By this system any increase in taxes or other state charges for transacting business can be made to increase the rates in that state by increasing the state key-rate.

Any decrease in taxes or other state charges, or in fire-costs resulting from improved public protection, or fire prevention work; also legislation which in its effect will reduce the average rate of the state by raising the ratio of insurance to value, all such improved conditions will decrease the fire insurance rates in that state by reducing the state key-rate.

IX. Unversality.

Universal justice will be obtained by state, city and town, by every class, grade and quality of risk, in the fire insurance rate thus computed.

X. Rebating.

Under this system of rate-making, rebating, in any form, will become a thing of the past. A five per cent addition to actual cost for profit will furnish no margin for rebating or specialized preference.

¹ German Alliance vs. State of Kansas.

THE EXPERIENCE GRADING AND RATING SCHEDULE

I

RATE-MAKING—PAST AND PRESENT

"Time is a great innovator, and if time alters things to the worst, and wisdom and counsel shall not alter them to the better, what shall be the end?"

—*Bacon's Essay XXIV.*

No progress has been made by fire underwriters during the past fifty years toward bringing their rate-making methods to a scientific basis of true cost.

Originally the prices for fire insurance were limited to a few flat rates for general application. The method of flat rate-making (in contrast to schedule rating) continued from the beginning with increasing specialization but with very imperfect success in differentiating between the good and the poor risk.

As the business of fire underwriting expanded and became an essential companion of commerce and manufacture, its underwriters gave closer attention to their rate-estimating, that one insurer might not be unjustly discriminated against as compared with another having a like or similar property.

This caused the underwriter to analyze the hazards of construction and occupation and assume or estimate what a risk would be worth to insure if free from correctible hazard. In other words, he estimated a rate for the perfect or standard risk, thus establishing a so-called basis rate. The worth of each possible defect was then estimated and with the base rate and defect charges so obtained a rate was built up in each case which—though a sum of esti-

mates—placed one insured *relatively* upon a fair basis with another.

In this manner schedule rating had its beginning and a great impetus was given to its development by the National Board in the early seventies. In the preparation of a schedule, the base rate and charges for deficiencies were increased or diminished as thought necessary to bring the final rate produced to that sum which accorded with the judgment of the schedule rater, although that judgment was acquired without any knowledge of the detailed costs of insuring risks. The schedule of to-day, by whatever name it may be called, in these respects is no different from the schedule of fifty years ago.

It is therefore evident that no progress has been made during the past fifty years in the direction of *experience-made* rates (actual cost, plus profit). Schedules, it is true, have been divided and subdivided into many parts with the purpose of making the analyses of supposed fire hazards very thorough and giving to each a definite recognition in the estimated charges, but no proof can be given that these hazards have any known or obtainable experience cost or that the final rate is correct or even reasonably so.

The basic principle of a well-known system of rate-making now in use has been explained as follows: "Each individual charge is assumption based upon consensus of opinion and underwriting judgment. Under the law of error large errors are not possible and there are likely to be as many errors on one side as there are on the other. Under the levelling influence of competition each charge will be automatically regulated within limits not far from the true mean."

This statement is confirmatory of the assertion that the charges in every schedule in use to-day are purely arbitrary assumptions without known or obtainable experience costs to sustain them. This is necessarily so because underwriting experience cannot be allocated to the several defects or items for which the rating schedule provides, therefore,

where no experience is obtainable there can be no knowledge. Experience is gained only from the insurance of risks or property on the one hand and from losses and expenses incurred on the other. The hazards set forth in detail in a rating schedule are never dealt with or met in the underwriting of fire insurance.

It is frequently claimed for the rating schedule of the present day that it is a standard of measurement analagous to a yard-stick or tape-measure.

Is such a statement or claim justified by the facts?

The surveyor may estimate the length of a lot at 100 feet, or if desirous of making a closer estimate he may pace it, but if exact measurement is needed he must use his tape-line by means of which he will learn the exact legal-standard measure, which can neither be questioned nor gainsaid but will be accepted by every authority.

The rate-maker may decide from his best judgment, or estimate that a given risk is worth two percent, or he may apply a rating schedule to the risk in question which may produce a two percent rate. But there the analogy ceases, for if either estimate of the rate-maker be called in question, no proof, nor legal-standard measure exists by which the rate may be verified, adjusted or proved to be reasonable. Only from actual recorded experience can verification or correction be made, and that proof or standard of measurement is as yet non-existent.

The buying of fire insurance under present methods has been likened to the buying of goods or merchandise without knowing their weight or measure, the purchaser being compelled to depend upon the experienced guess-work of the party selling. In contrast to these conditions as they exist, the system herein proposed would enable the expert to compute all rates from actual experience costs and the verification of their correctness would be a simple matter. If a practical system can be devised, whatever it may be or by whomsoever designed, which is based upon actual experience, it should be made the one and only standard in

every part of the country from which that experience has been drawn.

In the presence of these well-known facts, should company officials—whose annual collections in premiums in the United States have now reached approximately seven hundred millions of dollars—be *satisfied* to continue in the ruts of judgment or rate-estimating while there is a reasonable hope that a sound, scientific and practical system of rate-making founded and built upon the experience of their companies, may be substituted?

II

THE EXPERIENCE GRADING AND RATING
SCHEDULE

"I have but one lamp by which my feet are guided, and that is the lamp of experience. I know no way of judging of the future but by the past."

Patrick Henry.

The Fire Insurance Company is, in its internal affairs, no less than a dual institution having its financial department in which the interest of the stockholder centers and its underwriting department which deals only with the policyholder.

The underwriting department depends upon its running mate for its very existence but not so the financial department which could continue its investment interests with increased security to its stockholders though with lessened advantage, even if the underwriting department were discontinued.

In brief, the stockholder becomes a guarantor to the policyholder for the fulfillment of his policy contract, to the extent of the entire resources of the company; and history proves that even when those resources become impaired or exhausted by enormous disaster from conflagration, the stockholder but rarely refuses to go down into his pocket for whatever additional funds are required to make good the company's obligations.

Therefore, no better security can be found than the policy of a sound, well-managed fire insurance company.

For this security, the company charges its price—called the premium.

It is easily proven that in the *aggregate* and over a long period the insurance company receives no exorbitant price for its service to policyholders, but the company cannot prove—because it does not know—whether the premium charged the individual is excessive or inadequate, having

no exact nor approximate knowledge of the real cost of its service, either in detail or as between one class of property and another of different kind of hazard.

There is no possible way of so adjusting premium charges, even if the separate cost of the various classes of business insured were exactly known, that no more nor less than cost, plus a fair profit, would be collected from each class, for premium rates are charged for losses *to occur*—unknown but anticipated—and excessive loss is frequently occurring in classes and in localities that have before been profitable. But the insurance company should know for itself and be prepared if need be to demonstrate to others that no classes have been *habitually* and *excessively overcharged*, or others *uniformly under-charged* and in these respects of detail, which involve a question of fair dealing with its policy-holders, the company is now ignorant.

When the classification and grading of underwriting experience is well advanced, the company—and its customer, too, if desired—will have knowledge of the true costs of fire insurance indemnity.

The records of the underwriting department should contain the detailed evidence of its operations from which should be obtained its true underwriting experience, and as this work deals with the facts of that experience and not with the finances of the companies, it will suggest the way to a scientific preparation of same.

The theory, structure and operation of this schedule should be readily understood by its readers and one prominent purpose in revising the original work published in 1915 was to enable the student, layman or underwriter to better and more readily acquire knowledge of its principles and application.

The theory originated in the conviction that price-making for fire insurance should be governed by the actual cost of past production and not, as at present, be dependent upon assumption or estimate.

All forms of insurance assure to the purchaser—i.e.,

the policyholder—financial indemnity against future disaster which may or may not happen.

Other businesses deal in commodities, which have been purchased at a known cost, from which profitable selling prices are determined.

Therefore, there is a radical difference between the two, the one having accurate knowledge of the cost of goods to be sold, while the other—insurance—may learn the cost of former and matured transactions, from which the prices upon present transactions, maturing at some future time, should be gauged.

Past experience, consisting of many transactions of many companies, sufficient in volume, breadth of territorial scope and years of record to yield dependable and safe averages, should be the source from which all insurance prices are derived.

The theory upon which this schedule has been developed requires full recognition of state average costs as is already fairly well done even under present rating methods, but it can be done far more accurately than now. The ultimate or final average rate assigned to a given risk should be the averaged result of classified occupancy cost and state experience.

The elemental differences between this and existing systems of rate-making are as follows:

Present systems deal with the *specific risk* and the estimated cost of each of its defects.

This new and proposed method would deal with the *average risk* because its actual cost in the past can be ascertained from obtainable experience of the insurance companies.

The cost of a specific risk cannot be ascertained. It does not exist. It must, therefore, be made up of theoretical costs. The actual cost of an average risk can be mathematically determined.

For obtaining actual costs the Actuarial Bureau of the National Board is an essential necessity for collecting, an-

alyzing and combining the companies' experience. Other systems of rate-making than this have no need for that or similar service.

Experience wherever referred to in this work, unless otherwise mentioned, means the *combined* experience of stock companies, which to the number of nearly two hundred and fifty (250) are thus co-operating at the present time.

All fire underwriting experience of the stock companies for the United States (writings, expenses and losses) is reported in their annual statements to the insurance departments of the states. These statements contain reliable and correct returns of that experience *in the aggregate*, save as it may be affected by the inclusion of unrelated business obtained from countries outside of the United States, or from classes of business in the United States which have no relation to fire insurance. Such unrelated business for this purpose should be excluded from fire underwriting records. When such eliminations are made, especially the marine, automobile and non-United States business, the companies' *national* experience would be ready for use in obtaining the average cost of an average risk in the United States.

As with national experience, so *state* experience if correctly reported should consist of losses and expenses together with the amounts of writings.

Occupancy experience if correctly compiled should, in the aggregate of all classes, equal United States experience. When the tabulation by the Actuarial Bureau of class experience for the United States as originally undertaken is sufficiently advanced, the loss or fire cost of an average risk in every class will be known.

The manner of computing the cost and total selling price for the business of the stock companies for a ten-year period, 1910-1919, is illustrated from returns made to the Insurance Department of New York, from which the following statement has in part been compiled.

UNDERWRITING COSTS OF STOCK COMPANIES IN THE
UNITED STATES, FOR TEN YEARS, 1910-1919

Amounts insured during the period named. \$335,233,214,464

Losses thereon	"	"	"	"	1,644,553,378
Losses to occur on business written before but expiring after December 31, 1919, as estimated ¹					227,193,139
Expenses during the period named.					1,430,893,984

Cost to Companies of ten years' insur- ance, 1910-1919.	3,302,640,501
Add for Profit, 5% of the selling price.	173,823,184

Selling prices. \$3,476,463,685
An average rate of 1.03%.

¹ Being 50% of the amount of unearned premiums, which experience has shown is a reliable method of estimating losses *to occur* upon outstanding risks.

With the average rate of 1.03% for the United States so obtained, the initial step has been taken in the direction of rate-making from actual experience, and such average rate would form the key rate of the Experience Grading and Rating Schedule system.

From the nation to the state would be the second step to be taken and the same method as above would be carried out. Every state is a complete unit in itself territorially, governmentally and politically. Each has its own underwriting experience or loss record which is more or less different from that of other states, but the reasons for those differences it is not easy to fully explain. At present the average state rate cannot be accurately determined for the reason that both company and state records are lacking in the complete information required. When, however, the records of each state contain the writings, losses and expenses of the stock companies for the *state* as with the United States (with marine and automobile business elimi-

nated), the average state rate can be obtained in the same manner as that of the average rate of the United States.

An interesting feature of state ratios is the wide difference in the loss and expense costs per \$100 of insurance in the various states shown by table, pages 46 and 47, columns 3 and 6 (which appeared in the Experience Grading and Rating Schedule published in 1915 and is here reproduced with slight changes). Both in conflagration and in ordinary losses these differences are to be noted, but whether before or after conflagration losses have been spread pro rata over all the states, the evidence thus presented makes it very clear why rates should vary in different states according as their loss-costs and expense-costs vary—see also column 8 of same table.

A former commissioner of Colorado (S. Epstein) in an article written by him in 1914 on the subject of rate-making, after giving his views in detail, summarized them in part as follows: "For the making of rates the unit of area is (should be) the nation and the unit of time should be twenty-five years and any readjustment of rates should be made once in five years and made upon the combined experience of the preceding twenty-five years."

The president of the Insurance Commissioners' Convention, Hon. J. G. Brown of Vermont, at the annual meeting in Los Angeles in September, 1920, remarked: "Five years is the usual time on which to base profits under ordinary conditions, but should not the average for a longer term be considered when such unnatural and extraordinary conditions are present? The outlook for an early adjustment is not encouraging and the unusual profit made by fire insurance companies during the unprecedented rise in prices may show a corresponding loss during a similar period of decline."

In further illustration of these arguments the recorded experience of the stock companies for twenty years here follows:

TWENTY YEARS' FIRE UNDERWRITING IN THE
UNITED STATES
1900-1919

	<i>Ten Years</i> 1900-1909 incl.	<i>Ten Years</i> 1910-1919 incl.	<i>Twenty Years</i> 1900-1919 incl.
Premiums Earned	\$1,964,425,758	\$3,322,876,854	\$5,287,302,612
Losses Incurred.....	1,248,337,873	1,644,553,378	2,892,891,251
Expenses.....	779,094,156	1,430,893,984	2,209,988,140
Underwriting Cost.....	\$2,027,432,029	\$3,075,447,362	\$5,102,879,391
Loss in Earned Premiums....	63,006,271		
Ratio Loss.....	3.2%		
Profit in Earned Premiums..		247,429,492	184,423,221
Ratio Profit.....		7.45%	3.49%

The foregoing record of twenty years' fire underwriting in the United States is the more impressive and informing because of its division into two periods of ten years each. The first decade included within its first seven years the largest conflagration losses ever known in the United States for a like length of time, but its last three years following the San Francisco disaster (in 1906) were years of prosperity enabling the companies to recover very materially from their tremendous losses of the preceding seven years, with the result, nevertheless, that losses and expenses for the ten years 1900-1909 exceeded earned premiums by over sixty-three millions of dollars or a ratio of underwriting loss of three and two-tenths percent.

Had rates been revised upon a national basis at the close of this first ten-year period a large advance in rates would have been inevitable, but viewed retrospectively after the close of another ten-year period it is seen that any very large advance would have been unwise.

The early years of the second ten-year period were less favorable but the later years were of steadily increasing prosperity, until the profit on earned premiums of the year 1919 exceeded nine percent.

In considering the results of fire underwriting over these twenty years we find an underwriting loss for the first

decade of 3.2 per cent, a profit of 7.45 per cent for the second and for the whole period a ratio of profit of 3.49 per cent.

If, then, underwriting costs were reviewed every five years from a basis of a cumulative experience of the preceding years, until such cumulative experience covered a period in all of say twenty years, whether or not a readjustment of rates was needed would be clearly shown and it would place the rate-making problem upon a sound and undoubtedly just basis to all concerned, avoid needless fluctuations and make ample provision for conflagration losses. Essentially such methods will, indeed must, eventually be adopted, for only by a system of rate-making founded upon experience could such an adjustment of rates be scientifically carried out. The twenty-year record as presented embraces the United States, extends over a long period and thus gives to every single state in that record the full advantage of average and notably so to the states suffering enormous conflagration losses. No independent action regarding rates by a single state based upon its own experience without full consideration of the experience of other states could be sound or safe because of that lack of dependable average which only the entire experience of the United States would give.

Rate adjustment laws such as exist in the states of Missouri, Arkansas and elsewhere are fundamentally wrong in principle and will be found unwise if enforced. If not already known, it will eventually be recognized that full participation by every state in the experience of the United States, is imperatively necessary if just rates and relief from the effects of severe disaster are to be secured.

III

UNIFORMITY IN METHODS OF ACCOUNTING

Experience has been defined as knowledge gained by operation.

In the business of fire underwriting, experience of value for the determination of rates consists of the costs of outgo and the amounts of insurance assumed. Losses and expenses constitute that outgo, while the amounts of the policies exposed to fire loss furnish the other factors by which the ratios of that outgo are determined.

In order that the knowledge so gained be dependable for use, it must be accurate in its statistical details, extend over definite periods of years and embrace the experience of at least the majority of the fire insurance companies.

Statistics are valuable when and only when correctly compiled, by uniform methods, complete in all essential data and scientifically arranged. Subjects that are unrelated to each other, differing in their costs and purposes, should not be fused into one class or group, for such fusion would destroy their statistical value. It is likewise essential that the subject matter be thoroughly subdivided or classified into ultimate units, the "ultima thule" of experience, so that each group shall represent a single subject, being freed from other subjects unrelated to it—for an insufficient analysis will defeat the very purpose for which statistics are required. Fire insurance economics are not different in these essentials from other similar departments of knowledge and a condition precedent to sound and reliable insurance statistics is first of all uniformity in methods of accounting and reporting by the contributing companies.

A broad and sufficient classification of subjects and ac-

counts requires uniformity of methods in the distribution of experience between them.

Subdivision heads for the ledger classifications of *Expenses* were provided on page 3 of the "Convention Blank for Annual Statements" used in the years 1918, 1919 and 1920.

The "Standard Classification of Occupancy Hazards" adopted by the National Board of Fire Underwriters October 20, 1914, furnished the needed occupancy classes for the classification of *writings and losses*. Both classifications received the joint approval of state insurance commissioners and the stock fire insurance companies, members of the National Board.

Thus provision was made for book-keeping the underwriting experience of the companies in such uniform manner and to such extent as would supply the facts, viz., writings, expenses and losses, for the computation of ratios of cost, required in experience rate-making.

Uniformity in the recording of ledger classifications of fire underwriting experience has always been desirable since state insurance departments began to combine the returns of the companies. As state requirements increased, the unreliability of those returns when combined, because of lack of uniformity, became more apparent. So long, however, as companies made no attempt among themselves to pool their experience, little thought was given to the need of uniform methods, but with the adoption by the insurance commissioners of standard blanks for making annual reports by the companies to the state and the adoption of a standard classification of occupancies by the companies for reporting their experience to the National Board, the need of uniformity in bookkeeping and all records of statistical matter became more emphatic. The appointment in 1916 of a standing committee on uniform accounting by the National Board was a direct outgrowth of Actuarial Bureau operations. If the state insurance departments had one common bureau center for bringing together in complete

uniformity the mass of statistical information obtained by them from the companies—the whole to form a single report for all of the states—uniformity among the states in their blanks and other requirements would become a cardinal necessity of state supervision.

The various reports required by the several states from the companies are large in number. If uniformity in these requirements prevailed even as far as conflicting laws would permit, the situation would be simplified, the work required of the companies as well as the cost of same reduced, and underwriting statistics so reported would have much greater value because more correct and complete.

In a collection made a few years since of the various blanks sent out by insurance and other state departments to the companies, the total number of which though far from complete exceeded two hundred, there were very few which were identical in form. Even the annual statement blank standardized by the Convention of Insurance Commissioners and supposedly required by all the states is not absolutely followed in every instance. In most of the states a company is required to report annually its net premiums received in the state, taking credit for such reinsurances *only* as are permissible under its state laws. Compliance requires the companies to report to the *states* considerable sums of premiums as their own, which in fact have been paid away to non-admitted companies for reinsurance. A similar condition is found in the matter of losses. (These errors do not exist, neither would they be permissible in the general statements of the companies.)¹ This would be impossible if their blanks required net figures for the state as for the United States, even though a further report was

¹ If a company's returns to the states of its state figures be totalled and then compared with the company's annual statement figures, these discrepancies will become apparent.

In the case of one company, its actual figures for 1919 were \$217,683 *less* premiums and \$138,000 *more* losses than shown by aggregated state figures. In the case of another company the premiums were \$150,000 *less* and losses \$165,000 *more*, and so on; some companies showing much greater differences, others less.

made to meet the requirements of state taxation in which premiums and losses in non-admitted reinsurance companies remain; but as now, no reliable statistics of premiums and losses of the fire insurance companies for the United States can be obtained *by aggregating state reports*.

An even greater need in state requirements is a report from the companies to each state of expenses incurred by them for that state alone. Inasmuch as quite 42 per cent of premium receipts must be paid out on the average for expenses, the absence of this information state by state is an effective bar to correct state results. It is evident that state requirements conflict in some respects and lack in others, by reason of which statistical information is unsatisfactory and inaccurate; and this again emphasizes the fact that, while writings, losses and expenses *by states* as well as for the United States are absolutely essential to the development of scientific rate-making, such state statistics correct and uniform are at the present time unobtainable.

An excellent step forward was taken in 1918 when by joint action of the insurance commissioners and companies a change in the disbursement page of the annual statement blank was agreed upon by which the companies were required to report their fire expenses separate from the marine expense.

This went into effect for that year and for the first time the actual expense of the fire business unaffected by the marine could be ascertained.

Unfortunately this improvement was abandoned after three years' trial and commencing with the year 1921 the expenses of the companies will again be unseparated in their annual reports as between the marine and fire business if present requirements remain in force. The effect of this objectionable blend of two quite different classes of business is illustrated by the fact that one important company writing both fire and marine business in nearly equal proportions had an expense ratio upon its *fire* business in 1918 of 43 per cent while its expense ratio for the *marine* business

was but 25 per cent; thus the blend of the two expense accounts made an incorrect showing for either class of business for the company referred to and its figures thus made up and unseparated would be useless for experience rate-making. The average expense ratio of all marine companies for 1918 was 28 per cent—some of the larger marine companies having ratios under 25 per cent—whereas the expenses of the fire business reached an average of about 42 per cent. Correct statistical costs of the fire business cannot be ascertained while its records are thus confused by and mixed with the costs of another business so widely different in methods and in costs as marine insurance.

More than thirty years ago, in a paper read at the annual session of the National Insurance Convention, Insurance Commissioner W. S. Smith remarked: "The usefulness, economy and convenience of a uniform system and so far as practicable similarity in detail of state requirements upon insurance companies are so obvious that a re-statement or insistence upon them at this time must almost seem impertinence," etc., etc.

The president of the National Board (Mr. Bissell) in his address in May, 1918, remarked on this subject: "Owing to the large number of companies now furnishing several kinds of indemnity and the impossibility of segregating the expenses incurred in the transactions of each, it has been impossible as yet to prepare accurate and reliable tables indicating the cost of transacting the business of fire insurance, and therefore the rate of underwriting profit or loss resulting from fire insurance alone cannot be accurately ascertained. This is greatly to be regretted but it is hoped that with the incorporation of the new so-called disbursement sheet in the standard annual statement blank we may hereafter be able to compile statistics which will be more accurate and reliable."

This hope, though realized for the years 1918-1920, cannot again be realized if the expenses of two classes of

business so radically different as fire and marine are reported as one by the fire and marine companies.

There can be no objection to leaving the minor specialties—such as tornado, explosion or even hail (and these specialties represent hardly eight per cent of the entire business) with the fire business itself, for when given specific occupancy classifications, the separation of premiums and losses of each specialty will follow naturally and correctly. As for expenses, these specialties cost essentially the same as the general fire business of the companies, and there is little better *statistical* reason for eliminating them from the records of the fire business than for example, the separation of sprinklered or railroad business—either of which is quite as much a specialty as tornado, explosion or sprinkler leakage. The belief exists that complete separation in accounts should be agreed upon by the states and the companies between:

- I. Fire and miscellaneous business, in the United States.
- II. Automobile.
- III. Ocean and Inland Marine.
- IV. Business foreign in location to the United States.

Such separation of all writings, premiums, losses and expenses—eliminating from the fire insurance companies' accounts everything but their United States business upon the fire, lightning and miscellaneous classes—is of extreme importance for developing a true and reliable statistical record for loss-cost purposes.

Uniform accounting has become not only common but almost universal among businesses of large magnitude such as the steam and electric railroads, telephone and telegraph companies, electric light and power stations and many other classes of business. In this respect the fire insurance business is far behind. While the fire insurance company maintained its isolation as regards combining its fire experience with that of other companies, it mattered little whether or not its accounting methods differed from those of its com-

petitors; and in reporting to the states little interest was shown by either company or state insurance department whether the companies maintained a uniform accounting system or otherwise, for so long as the companies complied with the requirements of the department, neither party—state nor company—needed to be very deeply interested in uniform methods.

The president¹ of the Insurance Commissioners' Convention in 1916 favored the elimination "of so many state reports for one company, preferring one issued by all the states from one office—one report to do service for the forty more or less now being published." Whether the reports of the companies are to be sent to their own "bureau of fire insurance economics" (the Actuarial Bureau) or to one or many states, the disadvantages of unreliable statistics compiled from conflicting information is realized more keenly every year. Quoting a well-known authority:² "Business is a mass of financial transactions. Business without knowledge concerning those transactions means failure; knowledge without accounting is impossible, accounting makes it possible for the executives of giant corporations to run a huge business as intelligently as small businesses had previously been run."

Though these remarks referred especially to the railroads and immense trust organizations, they apply equally well to so vast a combination as the companies now represented for statistical purposes in the Actuarial Bureau of the National Board and imply the necessity of absolute uniformity of record.

Statistical accuracy in the annual statements of the companies to the state insurance departments can be secured with certainty by the following changes in requirements:

I. Complete separation of writings, premiums, expenses and losses of the Ocean and Inland Marine, Automobile and business foreign to the United States, from the other business of the fire insurance companies.

¹ Hon. Burton Mansfield, Insurance Commissioner of Connecticut.

² Professor John Raymond Wildman.

II. Report of all state expense, both direct and overhead, of transacting business in the state reported to.

III. Report of *net* premiums, losses and writings in each state less *all* reinsurances.

Without these essential matters of information no reliable statistics of either United States or state costs can be obtained. Uniformity of accounting when once in full operation by all of the companies will give untold value to all statistical information; and, when thus uniform, a due separation of expenses between the four groups named can be readily made.

Perhaps one of the most striking instances in recent years of unreliable reports by companies to the state (because of lack of uniform accounting) occurred in May, 1920, when the state of Arkansas called upon the companies for a statement of their expenses, direct and overhead, for a given period upon their Arkansas business. The expenses so reported per company ranged all the way from $5\frac{1}{2}$ to $63\frac{1}{2}$ per cent of premiums! The probable total expense cost of doing business in Arkansas of each company *averages* at least 40 per cent!

A similar report was called for in 1919 by the insurance superintendent of New York State, who requested the companies to report their business of the previous ten years state by state for the United States giving premiums, losses and expenses for each state. It proved to be impossible for the majority of companies to comply with this request and the requirement of the superintendent was therefore waived.

A record of insurance by states, such as was recommended by the president of the National Board (Mr. Richards) in his address in 1916, is needed to meet such requirements.

IV

CLASSIFICATION OF WRITINGS AND LOSSES
BY OCCUPANCIES

The first positive movement for combined classification of national experience of the fire insurance companies originated with the Insurance Department of the State of New York.

On May 12, 1912, the late Hon. W. T. Emmet, then insurance superintendent, requested the companies to furnish him with their experience in writings, premiums and losses "in New York State and elsewhere," for the twelve years preceding January 1, 1912, and submitted a proposed list of classes for the guidance of the companies in subdividing and reporting that experience.

The companies were aroused to immediate action and a meeting was held at which a committee of seven was appointed to confer with Superintendent Emmet. That committee consisted of C. F. Shallcross, E. H. A. Correa, Thomas C. Temple, J. Montgomery Hare, E. G. Richards, M. O. Brown and J. H. Stoddart, Mr. Richards being made chairman of the committee.

The history of the conferences that followed was reported in pamphlet form to the companies by the National Board of Fire Underwriters. While no final conclusion was reached, their outcome was a tacit suspension by the insurance department of the instructions so issued.

During the months succeeding the conferences with the New York Insurance Department, the uncertain position in which the fire insurance companies were then placed, because of the growing demands from insurance departments for their classified experience, strongly impressed the then

vice-president of the National Board of Fire Underwriters (Mr. Richards), who recommended, by letter December 11th, 1913, to the executive committee, the appointment of a committee of seven to consider and report upon the following propositions:

- I. A standard classification of occupancy hazards for the United States.
- II. A suitable plan for reporting to the Board by its members of all amounts (risks) written in the United States.
- III. A plan for reporting to the Board all losses sustained by the members.
- IV. A feasible plan for schedule-rating to be founded upon the combined experience of the companies.
- V. The creation of an Actuarial Bureau and a committee to be placed in charge of same.

These recommendations were approved by the executive committee December 11, 1913, a committee¹ was appointed and its report adopted² by the National Board at a special meeting held in the following September. Thus the eventual outcome of the movement commenced by the State of New York, was the inauguration by the National Board of a broad and comprehensive policy for gathering and combining the fire underwriting statistics of its members.

A standard system of classification by occupancies and the detailed methods required for reporting losses were soon in operation and placed under the direction of an Actuarial Bureau committee.

The theory and principles of classification as applied to fire underwriting experience and some of the historical facts

¹That committee was made up as follows: George W. Babb, F. C. Buswell, Charles H. Coffin, C. H. Dunlop, H. A. Smith, J. H. Stoddart, and E. G. Richards, Chairman.

²This action was endorsed by the National Convention of Insurance Commissioners at its convention in Chicago, September 17, 1914: "The Convention pledging its support to the plan so laid out for a uniform system of classification of losses incurred and risks written; also for the purpose of securing uniform and combined experience of value for rate-making purposes."

Similar action was taken by the Fire Marshals' Association of North America at its meeting in Chicago, by resolution September 11, 1914.

in connection with this remarkable forward movement as a foundation for scientific rate-making, will be found in the following pages.

The foundation principle of insurance is average. Insurance against the danger of damage or destruction by fire to property would be extremely unsafe if the premium to be charged was not based upon the chances of loss among a sufficiently large number of risks assumed to yield reliable average. As a well-known writer has expressed it, "rates are only estimates of losses expected," and while the rate-maker of the future may not be a prophet, he may be an historian, if his rates correctly interpret the history of experience.

It would be impossible to name with a degree of certainty the number of years of experience that are required to furnish a reliable average, but it may be rightly assumed that an extremely low rate requires the longest term of years and the largest number of risks, for safe average. The safer the risk the lower will be the rate and as rate diminishes the amount of liability per writing or policy increases and for the obvious reason that as the chances of loss are reduced the underwriter increases the amount of his line subject to one loss. The reverse is equally true, for as hazard increases rate of premium increases to correspond, but the underwriter reduces his line in due proportion. Average, therefore, is found more quickly in a highly rated, extremely hazardous class because written in small lines and insured for not longer terms than one year, but is more remote in the low-rated classes of superior quality which are written in larger lines and frequently for longer terms than one year. Approximately five years' experience on the extremely hazardous business would give a safe average, but experience has shown that the business which is superior in construction and protection, and consequently insured for merely nominal rates and for terms from one to five years, will require at least twenty years to secure

reliable average even though the business be written in large volume.

The essential necessity of adequate average should therefore be borne in mind as consideration is given to systematic classification of fire underwriting experience, for the thought that some plan is possible for ascertaining by means of such experience a dependable average cost of property insurance has been prominent in the minds of underwriters and state officials for many years. One of the best known and ablest insurance commissioners of former days—Elizur Wright of Massachusetts—in his annual report January, 1862, noted as follows: "With a view to inaugurate some system by which the value of different classes of fire risks may be ascertained, we last summer issued a circular to the fire insurance companies doing business in Massachusetts inviting them to place us in possession of statistics in regard to their experience on all risks in three classes: one of inhabited dwellings (supposed to be the minimum hazard), one of shaving risks (supposed to be the maximum hazard) and the third class including all other risks. It is important that there should be not only a substantial identity in the classification but that the amount at risk and the time for which it is at risk should be exactly stated. The majority of companies declined to furnish the information, pleading as a reason the want of sufficient office force for the purpose."

Classification, meaning an orderly arrangement, is required wherever many items or subjects of a dissimilar character are to be dealt with. Occupations that are unlike in hazard should, therefore, be given individual and separate classification, for if two or more unlike hazards are fused into one class such fusion will destroy their statistical value. For this reason it is important that occupational hazards be thoroughly subdivided into classes, to which there can be no practical objection.

This cannot be determined satisfactorily except by a reasonable trial, for much is yet to be learned from the gigantic work in which the National Board is now engaged

of the compilation annually of one hundred billions or more of writings in the United States.

The shopkeeper classifies his goods, the librarian his books, the accountant his transactions. Without proper classification in business, in science and in art, all would be chaos and progress would be impossible. The fire insurance company conducts a veritable department store, insuring everything of a combustible if of an insurable nature. It is therefore necessary to segregate the income and outgo arising from its insurances in their several departments or classes. When this is done each kind or class of occupancy, to which is applied for the moment the name of department, will have its own experience of income and loss outgo. If one or more classes are unprofitable (and it is always the case that some are) the shortage must be made up from the profits derived from other departments or classes, viz., from the underwriting profits of the company, and if such profits are insufficient the loss must be made good from interest earnings, from surplus funds or, at the worst, from the capital itself of the company.

Towns, cities and states are likewise reciprocally dependent because due average results are obtainable in but few if any classes when their experience is drawn from a smaller territory than the United States. No one state, however large, can be independent of other states in this respect, for even the largest may fail to produce premium income sufficient to cover its losses and expenses in the event of its fire losses being exceptionally severe or its prevailing rates continuously inadequate.

Finally, a combination of the classified experience of all companies will be unreliable unless the sum of all of the classified writings and losses equal the total experience of all the companies when aggregated from their annual statements. If these aggregates be more, it would be impossible to determine in which classes the shortages occurred. Therefore, unless the correct relation or proportion of writings to

losses in classes and as a whole is obtained, all ratios will be wrong and, of course, unreliable.

In the classification of experience for rate-making use, the records that are needed for the purpose consist of losses and the amounts of insurance issued (writings), for these two elements when properly collected and separated are the sole factors from which loss or fire-cost ratios are produced.

A classification of hazards as herein treated and the purpose for which the original "Standard Classification of Occupancy Hazards" was prepared and standardized by the National Board of Fire Underwriters, related wholly to the ascertainment of correct ratios of loss-cost class by class and for such purposes a record of premiums is no more needful than a merchant's record of merchandise sales is needed in the ascertainment of the cost of the merchandise sold.

When basic fire costs are obtained, expense and profit are the only remaining elements needed to make up selling prices (rates).

Previous to the present system of classification now in use by stock companies three attempts were made to establish combined classification. The first, devised by Jeremiah Griswold, was adopted by the members of the National Board about fifty years ago and generally used, but to whatever extent that experience was combined, the results were known to but a few. The system proved useless for any practical purpose and was soon abandoned.

In 1894 a very detailed classification list was issued by the National Board under the title "CLASSIFICATION OF HAZARDS FOR ANALYSIS OF FIRE COST."

The list included over 2500 numbered classes. It was accompanied by detailed instructions and sample forms for compiling the data required, also the statement that "it is not necessary to dilate upon the value of a class analysis . . . if twenty or more companies could be induced to combine their experience." This classification list was neither generally used nor is it known to have been adopted even by a single company.

This second attempt to secure combined classification was an aftermath of the Universal Mercantile Schedule, which latter was adopted "in principle" at a general meeting of the companies December 1, 1892.

The third attempt for combining underwriting experience was undertaken by about thirty companies, members of the Western Union, in 1903 under a then-agreed-upon classification list for western territory only, but after about ten years' trial it was found that little practical value was derived from the experience so combined and the classification bureau—which was an adjunct of the Western Union—was given up.

The Standard Classification of Occupancy Hazards adopted by the National Board October 29, 1914, was an evolution from previous systems of classification and although it was the outcome of the labors of the Actuarial Bureau Committee, covering a period of nearly a year, nevertheless its origin in important respects dated back many years. Its foundation was a classification system compiled in 1888-1889 in the preparation of which, *as to the list of occupancy hazards*, the systems of nearly twenty companies were freely used, and those earlier systems included those of the Home, Hartford, Ætna, Royal, Queen and other companies; also the Jeremiah Griswold system already referred to. Original features were introduced into that early (1888-1889) system, chiefly as an aid in memorizing the classes and their numbers. The hazards were divided into five groups, each group with its own assignment of numbers as follows:

Non-Hazardous.....	1 to 50
Mercantile (unsprinklered)	60 to 99
Manufacturing Specials (unsprinklered) .	100 to 189
Sprinklered Risks.....	190 to 199
Non-Manufacturing Specials....	200 and upwards
Odd numbers were given to brick and even numbers to the frames.	

In this manner thirty years or more ago was originated the classification system of a well-known Hartford company. Not long thereafter it was rumored that the system had been introduced into the home office of a British company. With but slight changes it was adopted by a New York office in 1900 and used thereafter by its four companies.

That early system was, however, devised for individual company use for ascertaining the loss or gain upon groups or classes and as a guide to its underwriters in the selection of business, but for obtaining the fire-costs of hazards from the combined experience of many companies it was deemed to be insufficient for the purposes of the Actuarial Bureau Committee; nevertheless it furnished an excellent foundation for a better system.

Utilized for the new or National Board system, the general groups were increased from five to six, the new or sixth group being devoted to miscellaneous occupations not otherwise provided for, and the list of occupation hazards was thoroughly revised and enlarged to meet present-day demands. Throughout the conferences held during the preparation of the new system by the Actuarial Bureau Committee, it was regarded as essential that *every* occupancy should be separately classified both as to its building and its contents if separable.

A guiding principle in the construction of this system was the fact that its agreed purpose was for obtaining from combined experience, *not* a profit and loss exhibit, but fire loss-costs of each separate hazard, for which reason a combination under one class of two or more unlike hazards was avoided wherever possible, knowing that such combined loss-costs would be valueless.

For the separation of experience on buildings from experience on contents, class numbers were applied—the even number indicating contents and the odd number buildings. Construction was indicated by affixing a letter to the class number and the general rules governing classification were thoroughly revised and made applicable to present condi-

tions. Revisions were repeatedly submitted to the entire membership of companies in the National Board for suggestions and advice, before final adoption of the completed work.

Thus was born a more elaborate and perfect system than had ever before been contemplated and the first ever devised for loss or fire costs only. It went into effect January 1, 1915. It was generally believed that with very slight alterations and possible additions to the list of hazards, the system deserved and would receive a careful trial by actual operation for a series of years, and more especially to learn which of the classes, if any, produced so small a volume of business as to make a separate classification unnecessary, or such classes as for a long period produced the same loss-cost and could possibly be combined for that reason. Without waiting for the knowledge to be so gained, a radical revision of the standard classification was undertaken to meet the wishes of those holding different views. The revised classification went into effect January 1, 1918. This revision largely abolished specific building classes of all kinds, and also a majority of specific mercantile occupancies; likewise many specific warehouse and special hazards occupancies; sprinklered risk classes were reduced to about one-sixth of their original number and many classes of widely varying experience were combined as one, thereby reverting in a large measure to the classification system referred to as founded in 1888-1889—a system which was devised and used for profit-and-loss purposes only.

The Actuarial Bureau Committee in its annual report to the National Board in 1918 stated that individual companies "may continue the more extended classification if desired." Evidently many companies are still using in their own offices the system first adopted, and as that system is constructively better than the revised classification for obtaining true loss-costs of occupancy hazards for rate-making purposes, it is given preference in this revision of the "Experience Grading and Rating Schedule."

V

WRITINGS AND FIRE LOSS-COSTS

Little thought was given by the fire insurance companies to an *exact* record of writings before they commenced to combine their United States experience. Unlike income and outgo, writings are not treated as ledger transactions and, though reasonable correctness may prevail, the degree of reliability to be found in the published reports of writings is uncertain.

Writings are the obligations assumed under policies issued; the potential liabilities, some of which become converted into losses. As writings constitute the divisor in the computation by means of which the loss ratio is obtained, it is most essential that their aggregate as well as their subdivisions into classes be as correct as it is possible to record and compile them.

Three different rules are favored for dealing statistically with writings for use in obtaining fire loss-costs:

I. *The commutation rule*: "By multiplying the amounts insured by the number of years for which the policies are written," the sum so produced being used as the divisor, the dividend being the amount of losses for the year.

By this plan, it is expected by its advocates that correct loss-costs can be computed from the writings and losses of each year without waiting for *earned* results.

ILLUSTRATION

(From average results for 1919 of four prominent companies)

	Writings in millions.	Commuted Writings.
Net Writings in 1919—one year	\$925.....	\$925
“ “ “ “ —three years	530 × 3.....	1,590
“ “ “ “ —five years	120 × 5.....	600
	<u>\$1,575</u>	<u>\$2,115</u>

Losses for 1919, \$5,815,000.

Ratio of losses to commuted writings—27½ cents per \$100 of risks.

II. *The expiration rule.* To the actual writings of a given year, whatever their terms may be, are added actual writings yet in force though written in previous years.

ILLUSTRATION

(From average results for 1919 of four prominent companies)

	Writings in millions.
Net Writings in 1919—all terms.....	\$1,575
“ “ of previous years in force December 31, 1919	1,265
	<u>\$2,840</u>

Losses for 1919, \$5,815,000.

Ratio of losses to total writings—20½ cents per \$100.

III. *The unit rule.* This rule follows the same method as used in ascertaining unearned premium liability. The writings in a given year are set aside, each term as a group by itself until terminated or earned, and against each group its cancellations and losses are duly recorded.

ILLUSTRATION

(From average results for 1919 of four prominent companies)

	Writings in millions.
Net writings in 1919—one year —expiring in 1920.	\$925
“ “ “ “ —three years— “ “ 1922.	530
“ “ “ “ —five years— “ “ 1924.	120

Losses unknown and unobtainable for each term until the expiration of writings in their respective years.

The net writings for each term to be used as a divisor, the amount of losses for the whole period for each term for the dividend, the result or quotient being the ratio of loss-cost in each group or unit.

Regarding rule I: For the ascertainment of *average rates of premium* there can be no serious objection to this method, provided correctness of writings is unimportant, but such information has no useful purpose in rate-making. If this rule be followed for the purpose of obtaining fire *loss-costs* the method is incorrect.¹

¹ From a close observation for the past twenty-five years of the results from a classification of writings and losses by one-, three- and five-year terms, and a comparison of the average loss-ratios obtained from each, the author believes there is but one correct method of obtaining those ratios, and that is by the so-called Unit rule herein described. Loss-costs on three-year or five-year dwellings will average lower per annum than on one-year terms, due to the fact that a less desirable quality of dwellings are insured for one year than for longer terms. The three- and five-year terms embrace the cream of the business, the loss-cost per annum of dwellings written for five years is even less than the per annum cost of three-year dwellings.

Ten years' actual experience on brick dwellings have shown an

	Cents
Average loss-cost per \$100, on one-year dwellings.....	10.6
“ “ “ “ <i>per annum</i> of 3-year business.....	5.4
“ “ “ “ “ “ 5-year “	4.4
When all business written in a given year was combined regardless of terms, the average loss-cost was.....	15.8
Average annual loss-cost produced by commuting the one-, three- and five-year terms above.....	5.5

The importance of separating one-year dwellings from those written for longer terms is self-evident. The misleading and therefore useless method which produces an annual average of 15.8 loss-cost for one year is likewise apparent, while the commuted average of 5.5 is useless for either the one- or five-year terms.

It would seem that those favoring the first, the Commutation rule (increasing the liability under policies having a longer term than one year, in the manner stated), overlook the difference in relationship between premiums to writings and losses to writings. The *premium is paid by the assured* as a consideration for carrying the liability for a stated term, whereas the *loss is paid by the company* if and when it occurs. The premium and the term are inseparable; the loss has no relation to the term except that whenever it occurs during that term its amount is limited to and cannot exceed the amount for which the policy was written. That amount may be absorbed the first day of the policy, or, what is true with a great majority of policies, no loss whatever occurs while they remain in force. Under this—the commuting system—the liability under a three-year policy is inflated three times its actual amount, and though that inflated amount if used to divide the *amount of premium* yields a correct ratio of annual premium, an *incorrect* ratio is obtained when the same inflated sum is used to divide the *losses*. For example, a \$1000 policy issued for three years for a premium of \$30 represents an average annual premium rate of 1%. If commuted to \$3000 for one year, the average annual rate will be the same, viz., 1%. But the same process for determining the ratio of loss, which, if the amount of loss be \$1000, would yield if commuted to \$3000 a loss ratio of $33\frac{1}{3}\%$, would evidently be wrong, for the amount of the loss equalled the total amount of the policy and therefore the true ratio of fire loss was 100%.

In regard to the second or Expiration rule: It has, at first thought, some merit and if a company's business were written for one year only and neither increased or decreased from year to year, loss-costs obtained in this manner would be practically correct, but variations in volume from year to year are inevitable and the greater that variation in volume, in the same degree the ratio of loss-costs from this plan would be incorrect.

Third, the Unit rule. This plan treats the writings of

each term in each year as a unit. At the end of each year, the writings of the year term by term are set aside and kept separate from all other writings until their expiration, and all losses which occur on those writings are recorded therewith. If it is true that ratio of loss-cost, if any, under a *single* policy is as the amount of the policy is to the amount of loss while that policy is in force, that fact is not altered if the two factors instead of being single are an aggregation of writings on the one hand and of losses on the other.

It is also equally certain that the principle of *earned* results of losses upon writings or risks should be employed in the ascertainment of ratios of fire loss, as that *earned* premiums be used in the ascertainment of ratios of underwriting profit or loss.

One process is analogous to the other.

A careful consideration of these several plans would indicate that the actual work, clerical and tabulation, under the third or Unit rule would be no more and probably less than under rules I or II; and if the unit rule is the only correct method of handling writings, that would itself decide the course which the statistician should take. The unit system cares completely for any differential caused by increase or decrease of volume of business which the first or second plans cannot deal with. It deals with the writings of the year as stated and after a lapse of one year all losses upon the one-year writings of 1920 would furnish the correct loss basis for loss-costs; the expiration of the three-year writings of 1920 (viz., in 1923) with the losses that had occurred during that period upon those writings, would furnish the factors for a true loss-cost. The same would be true of the five-year writings of 1919 with the losses thereunder during the ensuing years until expired in 1925.

The history of American fire underwriting is one of continual increase in volume of business written.

Loss-costs obtained by either method proposed—the Commutation or the Expiration rule—would inevitably produce incorrect ratios of cost, for writings so obtained would

not have become earned because the losses placed against them would be less in amount than would occur under those writings if held in suspense until expired.

Therefore the loss-costs produced would be false because inadequate, and if persistently used ruinous to the companies using such rates. (Note wide difference of average loss-costs as shown by the two rules on page 31.)

By those favoring the Commutation rule it has been stated that "the loss-cost of the given classes or subdivisions cannot be arrived at except by reducing all writings to a one year basis," but this is clearly wrong.

Correct loss-costs can be obtained only by continuing a year's writings to the end of their respective terms and under two conditions: First, by charging against the liability (writings) all losses occurring thereunder while they remain in force; and, second, by dividing the sum of the losses so occurring by the sum of the liability which has been exposed to loss. It is absolutely essential that both divisor and dividend be correct in amounts to obtain a correct quotient or ratio. Impair the correctness of either factor and the loss-costs will be incorrect and unsafe for use.

In brief, if writings and losses for loss-costs be tabulated in the same manner as now required for writings and premiums for ascertaining unearned premium liability, but subdivided into *classes*, a result of absolutely true loss-costs will be obtained.

In the classification of writings or risks written, the class number is placed on the daily report or copy of the policy. When loss occurs the number so recorded on the daily report of policy would also be given to the loss report both as to number *and year* of writings in order that the losses of a given year could be recorded against their respective terms. Consideration given to the question of cancellations may suggest that a different treatment should be given to such in the calculations for obtaining ratios of *loss-cost* than for ratios of *premium*. If the whole or a part of a policy has once been in force—that is, exposed to fire loss—

that liability should be preserved as a part of the eventual calculation, for what is needed in determining loss-cost is the amount of liability which has been exposed to loss during any part of the period of business being considered, whether it be one, three or five years. For *unearned premium* purposes, a policy when cancelled is at once removed from liabilities both as to its amount and its premium because premiums must be net at the end of the period for which they are calculated. For *loss-cost* purposes the preservation of liability once at risk is as essential as preservation of the loss, once occurred.

VI

EXPENSES

No rate-making system can be scientifically correct or complete unless definite recognition is given to the expense cost of transacting the business. Such recognition requires that the expense cost state by state be known and, in its true ratio, made a part of every rate. This is possible only in experience rate-making.

A peculiar feature of state experience is the variableness of the expense factor. Expenses to premiums for the United States average say 42%, while the ratios in the several states vary widely.

Those variations in the several states arise in part from the extra cost of travelling, expressage and similar expense in states where communities are separated by long distances. In some cases such differences are due to the preponderance of large city expense, always heavier than in smaller communities, but beyond these an important part of the expense in many states consists of local and state taxation. For this last named expense, ranging from 2% on premiums in some states to as high as 10% in certain other states, the state is alone responsible. States which choose to levy such heavy tax burdens should not expect to divide their excessive taxation with others whose requirements are more moderate. These variations are not apparent until, in the bookkeeping of the business, expenses are divided between the states as they are actually incurred. To do this all expenses specific to a state should be charged thereto direct and only such expenses as are of a general nature—known as overhead or administration charges—should be divided pro rata between the states.

For this purpose the expenses of the entire fire business should be separated into two classes.

The first class should include all expenses which are directly or necessarily incurred in or for a particular state, as follows: Commissions, salaries if local to the State, agency charges, local and state boards and inspection bureaus; taxes, licenses and fees of every kind (except national) whether levied by state, insurance department, municipality or patrol; also special agents' salaries and expenses, maps, expressages, travelling, legal and litigation (specific) and loss adjustment expenses.

The second, or administration expense not applicable to any particular state includes all expenses paid at the head or department office or offices as follows: agency and office supplies, salaries, pensions, rents, advertising, postage and exchange, telephone, furniture, legal expenses (general), directors' and auditors' fees and United States taxes. Such expenses should be divided pro rata between all states.

Pursuing this course, each state bears its just proportion of the whole expense of the company. This method has been followed by certain companies for many years, in the maintenance of separate records of their business by states and departments.

Losses already take this course, for the losses of a state are charged thereto and not to some other state or states—the only exception being conflagration losses in which all states share in due proportion under this system of rate-making.

It is only by such separation of expenses and losses between the states that a just as well as correct state average rate may be obtained.

Underwriters differ concerning the proper treatment of loss expenses, some believing that all such expense should be included in the amount of loss; others hold that nothing but the actual loss should be charged to losses and all expense of whatever nature should be treated as expense.

Of those who believe in the former practice, some carry

only actual adjustment expense to losses, while others go farther and include with losses a portion of special agents' salaries and expenses, or even more.

The Disbursement Sheet of the annual statement blank clearly provides for a separation of the two—paid losses from all expenses and as *all* expense of the fire insurance company directly or indirectly is incurred because of losses (for without losses there would be no fire insurance) a separation of loss from loss expense seems the preferable course in the interest of correct statistics.

If and when the expenses of the fire insurance companies are brought together in one combined record for statistical purposes the necessity for uniformity in the methods of accounting will be readily apparent. Without uniformity any combined record would be unreliable and useless for the purpose intended. With expenses divided state by state and compiled according to a uniform classification (see Disbursement Sheet), their true proportion in the average rate for state and class can be ascertained.

VII

LOSSES

To the fire insurance business losses are an indispensable cost. Without the one the other would not exist, but it does not follow that losses should be looked upon with indifference or be encouraged. True generalship in the fire underwriter lies in his ability to forward fire prevention, discourage preventable losses and give every possible encouragement to standard construction and protection. Non-preventable fires which spring from natural causes or the inevitable weakness of human nature which produces carelessness, will always be present. Much is being accomplished to reduce the fire waste in the United States and the fire underwriter may reasonably anticipate a gradual reduction in normal loss ratios, paralleling in a sense a similar experience of the life underwriter whose mortality tables are said to show an increasing need of future readjustment to a lower level of premium rate because of a decrease in the ratio of mortality. Even as a leading life company gave prominence in its advertisements to the statement, "the death rate of 1919 the lowest in the history of the company," so may some aggressive fire company (in the far future) use as its shibboleth "the lowest loss-cost rate in the history of the company"!

The question of most importance to this present subject is, How shall fire losses be dealt with in the statistics of underwriting experience to obtain correct and valuable results?

If true fire loss ratios are to be obtained, the essential need of correctness in the amount of losses used to obtain these ratios is indisputable.

The preference to be given as between paid and incurred losses for a given year or years is of great importance and the reasons for preference of either should be made clear. The financial statement made annually by every company takes into account the amount of losses paid during the year, also the amount of its losses outstanding and unsettled at the end of the year.

In the first year's business of the company, the sum of the two—paid and outstanding—would constitute the incurred losses for the year; otherwise the incurred is obtained by deducting the amount of outstanding losses at the beginning of the year from the sum of the paid losses and the losses outstanding at the end of the year.

For instance, if the losses paid during the year amounted to \$1,000,000 and the losses outstanding at the close of the year were \$300,000, from the sum of the two, viz., \$1,300,000, would be deducted the outstanding at the commencement which if \$100,000 would leave the sum of the incurred losses for the year, viz., \$1,200,000.

If a correct statement of a company's financial standing requires that losses incurred though unpaid at the end of the year be accounted for in the underwriting record, it is none the less important that incurred losses, whether paid or not, appear in the statistical records of the year, though for a different reason. That reason will have greater force when fire loss-costs become the acknowledged basis of an operative rate-making system which would require practically a readjustment, if necessary, of rates at the end of every five or ten-year period. If losses always remained normal in amount one year with another the objection to the use of paid losses would not be so obvious, but the uncertainty of future loss is great and excessive loss is liable to occur at any moment, and if such excessive loss remained unsettled at the end of the year a much larger sum for the year of incurred than paid losses will be the result. Conflagration losses occurring during the closing days of the year could not be adjusted and paid before its close, the result

of which would be that nothing unusual would appear in the amount of paid losses for that year, yet the liabilities of the company would be increased by the amount of its unpaid conflagration loss, perhaps seriously affecting its financial status, and in remote cases that increase in liabilities might be so great as to wipe out the company itself. For this reason if for none other it is essential that all losses appear in the statistical records of the company according to their respective classes and in the year in which they occur, and for no less important reason than in its financial records.

This view has never been more strongly emphasized in recent experience than by the conflagration losses on Black Tom Island, N. J. (in New York Harbor), July 29, 1916. Owing to the question of liability of the fire insurance companies involved by these losses, claims for which amounted to nearly ten million dollars (\$10,000,000), a large proportion was carried over to the year following as unadjusted claims. These were chiefly for losses on and in warehouses; hence, although the warehouse classes (Nos. 251-280 and 819-826—see Classification, pages 137, 143) had sustained phenomenally heavy losses in that year (1916), by following the rule of using paid losses for classification purposes, the warehouse business for that year may have shown an apparent profit though in fact the class record was probably crippled for many years.

Many companies, perhaps most, use incurred losses in the statistical records of their own business. For statistical purposes paid losses are more easily handled but furnish incorrect statistics, while incurred losses give correct results even though slightly more trouble to the classification clerk. For the reasons given it is believed that "incurred losses" is the true factor for loss-cost purposes.

The collection of loss information from the stock fire insurance companies of the United States and the analysis of origin of fires by states and class hazards is an immense and costly work.

The loss records of the Actuarial Bureau are growing in volume and completeness year by year. The first five-year record, 1915-1919 inclusive, of losses by states and causes recently made public, is more interesting than any similar record ever published in this country. In condensed form it shows that for the five years quoted the losses reported to the bureau amounted to \$891,449,402 in the United States.

(The fire losses of the Stock Companies for that period as reported to New York State amounted to \$993,829,151; losses of Mutuals and Companies non-admitted to New York not included in these figures.)

But the most impressive feature of this report is disclosed in the causes which produced that enormous loss, for,

33% of the whole amount occurred from unknown causes,

25% from carelessness and other strictly preventable causes, and

42% from partly preventable causes.

"Unknown" causes may safely be attributed chiefly to carelessness and incendiarism. Therefore, it is fair to estimate a loss of at least 60% or five hundred forty million dollars (\$540,000,000) for losses that should never have occurred.

It is a striking fact that not one cent more of that total sum of loss was borne by the parties responsible for those losses than others in the same classes whose record was free from all fire loss. That is not a wise or fair division of the responsibility. The one should be *to some extent* penalized while the other one who is free of all loss record should be correspondingly benefited in his insurance rates.¹

Viewed from any angle these statistics have little if any

¹"There is no hardship in enforcing personal liability for wanton damage and loss to individuals or the community. The fire evil is one of the worst and most wanton of the day. It could be cut in two in a year by the smallest effort and the simplest precautions. It is time it came to an end. The law should see to it and authorities should do their part by convincing delinquents that fire is not a visitation of Providence but generally a product of bad citizenship."—From the *New York Herald*, February 19, 1921.

practical value because no avenue has yet been found for transmuting those facts according to causes into the make-up of fire insurance rates.

In the consideration of losses as the chief cost of fire insurance and their various aspects as affecting rates, the conflagration hazard is a constant menace to the stability of the fire insurance company and a factor of great importance in rate-making. Full recognition must be given in the rates charged for this ever-present danger, if ample protection is to be furnished to the policyholder.

What is a conflagration in its meaning to the fire insurance business? No definition has yet been formulated that has received general approval; neither has the line of demarcation between an "ordinary" fire and a "conflagration" been authoritatively defined.

For rate-making purposes it would seem that a fire which has passed the control of human effort, involving the destruction of two or more buildings—be the amount of loss involved thereby great or moderate, is a conflagration.

The amount of the loss in one instance may not exceed \$100,000 even though the business district of a town be destroyed, and in the other it may involve a loss of several millions and yet represent but a small fraction of a large city.

The *amount* of the loss does not necessarily determine the question. The destruction of the town may be as great a calamity to *its* people and to the state as was the great fire in Boston to the business interests of that city and Massachusetts.

Whether the losses involved should be borne alone by the premium-payers of the state in which the fire occurred or should be distributed among all the states, is a question of amount and location of fire, the relation which that amount bears to the resources of the state in which it occurs.

If a fixed sum be named as the minimum amount of a conflagration loss, that amount to be pro-rated to all the states, such a rule would work injustice to the smaller states

even if the heavier burden could be collected from their premium-payers—an outcome extremely improbable; it would also work injustice to the companies, which could never recover more than a portion of their conflagration losses. Preferably every loss excessive in amount should be shared by all states in proportion to their premium incomes.

All ordinary losses should be covered by the rates collected in the states where the fires occur and, if so, it becomes quite as important to define an “ordinary” loss as a “conflagration” and a decision in one case settles the other. In this situation the problem is a relative one and can be fairly decided only by making each state share proportionately in such losses of other states, as the loss in each case exceeds a fixed percentage of the annual net premiums paid by the citizens of the state where the loss occurred.

The fire premiums paid in all the states to National Board companies in 1919 exceeded \$450,000,000.

In the year 1920 it is presumed that the amount of fire premiums for the same companies exceeded \$550,000,000.

If any single loss in a given state exceeded say *ten* per cent of its annual premiums, such sum divided pro rata between all the states in proportion to premium income would relieve the state where it occurred of an excessive burden and distribute it fairly over the whole country in accordance with the principle of average.

In such event the State of New York must have a single fire loss of six to seven millions of dollars before its amount would be pro-rated between the states, but Nevada's limit would be reached at \$60,000, Illinois at \$4,000,000, California at \$2,000,000, Alabama at \$650,000, Vermont at \$130,000, and other states in like proportion.

These figures are necessarily based upon the approximate fire premium income for 1920 of the states mentioned. Even a lower percentage than ten per cent for an excessive or conflagration loss might be more desirable.

TEN YEARS' INSURANCE COSTS COMPARED WITH AVERAGE

	Amount	1	2	3
	Insured	Losses	Loss Cost before Conflagration Losses were distributed to all States	*Loss Cost after Conflagration Losses were distributed to all States
Maine	1,677,883,088	17,186,035	1.024	01.000
New Hampshire.....	1,227,846,287	7,932,618	.646	00.727
Vermont	477,611,386	3,367,536	.705	.796
Massachusetts	12,102,580,680	69,023,912	.570	.636
Rhode Island.....	1,696,396,628	8,067,937	.476	.535
Connecticut	3,717,722,066	15,323,839	.412	.478
New York.....	52,296,895,424	203,608,662	.389	.441
New Jersey.....	9,719,370,473	38,501,054	.396	.457
Pennsylvania.....	17,758,093,020	82,309,238	.463	.536
Delaware	512,452,372	1,774,459	.346	.402
Maryland	3,369,937,833	42,391,828	1.258	.474
District of Columbia.	1,072,090,574	2,185,702	.204	.244
West Virginia.....	1,332,998,117	10,305,597	.773	.876
Virginia.....	2,421,753,933	17,163,966	.708	.806
North Carolina.....	2,102,723,438	13,639,524	.648	.730
South Carolina	1,380,757,058	10,023,123	.726	.809
Georgia	3,184,070,726	22,240,466	.698	.791
Florida.....	964,963,584	9,998,857	1.036	1.179
Alabama.....	1,684,420,685	16,857,474	1.000	1.114
Mississippi.....	1,431,170,399	17,043,948	1.191	1.265
Louisiana	2,802,331,857	20,670,229	.737	.840
Ohio.....	11,124,830,298	53,191,108	.478	.552
Indiana	5,729,503,165	29,954,645	.523	.597
Michigan	6,131,009,005	37,400,573	.610	.692
Wisconsin.....	4,991,267,014	28,873,743	.578	.666
Minnesota.....	4,763,333,363	35,575,590	.747	.837
Kentucky.....	3,142,743,191	22,989,727	.731	.820
Tennessee.....	2,566,199,436	22,574,547	.879	.976
Illinois.....	17,002,157,294	99,503,261	.585	.666
North Dakota.....	893,127,450	8,911,823	.998	1.122
South Dakota.....	812,371,118	5,244,809	.645	.744
Iowa.....	4,041,520,724	27,287,983	.675	.769
Nebraska	2,351,038,165	13,468,042	.573	.654
Missouri.....	7,554,969,088	40,724,052	.539	.608
Kansas.....	2,951,991,358	19,949,820	.676	.753
Oklahoma.....	1,722,657,177	11,767,107	.683	.767
Arkansas.....	1,109,754,414	11,018,694	.993	1.107
Washington.....	2,360,485,151	18,806,458	.796	.918
Oregon.....	1,203,356,453	9,296,920	.772	.890
Idaho.....	392,786,672	4,887,835	1.244	1.388
Montana.....	665,017,975	5,942,616	.893	1.039
Wyoming	172,950,878	1,009,588	.583	.711
California	7,907,713,958	184,040,439	2.327	.716
Nevada.....	140,566,461	1,497,395	1.065	1.227
Utah.....	527,455,589	2,633,364	.499	.595
Colorado.....	1,897,421,182	11,449,854	.603	.702
Arizona	255,099,195	2,788,114	1.093	1.251
New Mexico	291,451,084	2,570,821	.882	.994
Texas.....	5,116,639,902	46,570,320	.910	1.008
U. S.....	220,753,486,388	1,389,545,252	.63	.63

* Conflagrations of Bangor, Me., Yazoo City, Miss., Baltimore, Md., and San Francisco, divided pro rata among states.

BY STATES FOR YEARS 1903-1912
RATES RECEIVED IN 1912 and 1919

4	5	6	7	8	9	10
Tax Cost %	Other Expense Cost	Total Loss and Expense Cost per \$100 Insurance	Add 5% Profit	Total Cost Including 5% Profit per \$100 Insurance	Average Rate Paid to All Companies in 1912	Average Rate Paid to All Companies in 1919
.028	.437	1.465	7.3	1.538	1.46	1.59. Maine
.031	.356	1.114	5.5	1.169	1.24	1.34. New Hampshire
.042	.401	1.239	6.2	1.301	1.35	1.59. Vermont
.031	.319	.986	4.9	1.035	1.00	.95. Massachusetts
.026	.252	.813	4.0	.853	0.93	.92. Rhode Island
.026	.297	.801	4.0	.841	1.00	.93. Connecticut
.025	.250	.716	3.5	.751	0.75	.77. New York
.022	.344	.823	4.1	.864	0.87	.98. New Jersey
.028	.398	.962	4.8	1.010	0.99	1.06. Pennsylvania
.024	.270	.666	3.4	.730	0.76	.83. Delaware
.040	.438	.952	4.8	1.000	0.96	1.00. Maryland
.009	.257	.510	2.5	.535	0.53	.70. District of Columbia
.045	.550	1.471	7.3	1.544	1.47	1.31. West Virginia
.066	.466	1.338	6.7	1.405	1.41	1.27. Virginia
.054	.436	1.220	6.1	1.281	1.20	1.09. North Carolina
.063	.433	1.305	6.5	1.370	1.41	1.40. South Carolina
.049	.451	1.291	6.4	1.355	1.50	1.37. Georgia
.084	.808	2.071	10.3	2.174	2.07	1.56. Florida
.106	.578	1.798	9.0	1.888	1.71	1.55. Alabama
.063	.552	1.880	9.4	1.974	1.91	2.18. Mississippi
.071	.467	1.378	6.9	1.447	1.43	1.34. Louisiana
.042	.419	1.013	5.0	1.063	1.01	.88. Ohio
.032	.399	1.028	5.1	1.079	1.01	.93. Indiana
.037	.411	1.140	5.7	1.197	1.01	.99. Michigan
.067	.465	1.198	6.0	1.258	1.11	.97. Wisconsin
.054	.477	1.368	6.8	1.436	1.26	1.14. Minnesota
.058	.465	1.343	6.7	1.410	1.25	1.39. Kentucky
.056	.515	1.547	7.7	1.624	1.45	1.20. Tennessee
.043	.490	1.199	6.0	1.259	1.17	1.09. Illinois
.094	.707	1.923	9.6	2.019	2.02	1.60. North Dakota
.086	.571	1.401	7.0	1.471	1.53	1.40. South Dakota
.056	.537	1.362	6.8	1.430	1.16	1.26. Iowa
.036	.475	1.165	5.8	1.223	1.12	1.33. Nebraska
.046	.416	1.070	5.3	1.123	0.96	.93. Missouri
.077	.465	1.295	6.4	1.359	1.12	1.15. Kansas
.046	.513	1.326	6.6	1.392	1.22	1.31. Oklahoma
.028	.600	1.735	8.7	1.822	1.54	1.66. Arkansas
.037	.681	1.636	8.1	1.717	1.57	1.63. Washington
.031	.666	1.587	7.9	1.666	1.43	1.49. Oregon
.055	.701	2.144	10.7	2.251	1.78	1.38. Idaho
.085	.721	1.845	9.2	1.937	2.09	2.04. Montana
.066	.682	1.459	7.3	1.532	2.81	1.78. Wyoming
.030	.647	1.393	7.0	1.463	1.46	1.30. California
.036	.743	2.006	10.0	2.106	2.27	2.25. Nevada
.014	.442	1.051	5.2	1.103	1.21	1.22. Utah
.039	.560	1.301	6.5	1.366	1.41	1.52. Colorado
.082	.732	2.065	10.3	2.168	2.13	2.14. Arizona
.058	.605	1.657	8.3	1.740	1.36	1.81. New Mexico
.032	.485	1.525	7.6	1.601	1.47	1.38. Texas
.038	.404	1.071	5.4	1.125	1.08	1.07. U. S.

NOTES ON TABLE OF STATE EXPERIENCE, 1903-1912

This table, which appeared in the original issue of the "Experience Grading and Rating Schedule," is reproduced with slight changes in this revision of that work, because no decade of years in the history of fire underwriting in the United States illustrates so strikingly the interdependence of the states and their joint responsibility for excessive fire loss wherever it may occur, and at the same time the responsibility of each state for costs peculiar to itself, as presented in this table of *State Experience*.

As regards *Conflagrations*: Note their effect upon the loss cost in the states where they occurred (Maine, Maryland, Mississippi and California) and their effect upon the loss-cost of all states after their distribution pro rata. (second and third columns.)

As regards *Taxation*: Note the varying cost, which in some states is several times greater than in others. (Fourth column.)

As regards the *distribution of Insurance Cost between the States*: Note that even under present methods of rate-making the rates charged follow the experience cost remarkably well because of the influence of the natural law of supply and demand; yet how more scientifically and exactly that distribution of cost is effected by the use of this system of rate-making from actual experience cost! (Eighth, ninth and tenth columns.)

The "Experience Grading and Rating Schedule" provides for averaging over the whole country all excessive losses as above explained and with other losses would be used in obtaining the basic rates of each state. All loss experience would likewise be spread over a ten or twenty-year period.

VIII

UNDERWRITING PROFITS—A NATIONAL QUESTION

An adjustment of fire insurance rates to such a level as will yield an agreed ratio of profit to the fire insurance companies is not a state but a national question.

The fire insurance companies of the United States assumed risks in the year 1920 to the extent of more than one hundred billions of dollars and for this enormous sum of writings about nine hundred million dollars of premiums were received. If an average profit of not more than 5% of the premiums were realized by the companies over bad and good years there is little doubt such percentage of profit would be generally satisfactory—certainly the companies would not and the public should not complain.

Admitting that the reasonableness of a margin of profit of that percent is recognized by all interests, upon what basis should the calculation of costs be made and how could it be divided equitably between states and individual insurers?

From the very nature of the business of fire insurance a 5% profit cannot be uniformly realized every year, nor in every territorial division of the country, nor upon every class of business. Experience in both state and class is variable from year to year and excessive losses in one year followed by an exactly opposite experience is the frequent lot of class as well as state. No state is sufficiently large to carry the costs of its own fire insurance at all times.

If the companies are to be assured an average profit of 5% on their United States business, a profit larger than 5% from some states is essential in order that the loss in

others (which is inevitable though varying), may be made up during an agreed term of years. This is especially true when conflagrations occur.

A few states have laws intended to control the average profit which the companies may realize *in the state*, regardless of their experience in other states, and to require a readjustment of rates downward whenever a reasonable profit is exceeded. Such legislation, however, is impracticable and not in the best interests of state, company or policyholder. If those states having such laws were willing to guarantee that in case of excessive loss such excess would be made up by the state to the companies—in other words, would guarantee an agreed ratio of profit to the companies—independence in these matters as between state and state might be possible. No state, however, would be willing to enter into such a contract. It is very doubtful if the state in exercising any powers it may possess in the making or regulating of fire insurance rates has constitutional authority to permit an increase in the rates of its own citizens to meet the deficits of other states, and if that be true the state is clearly incompetent to fix its own rates of insurance as it would be unable to meet the fundamental needs of average upon which insurance depends and in which all states need to share.

In the operation of average, fire insurance has a definite public interest which binds together as one all insured interests, and surely so within a territory not less than the United States.

Every state expects when excessive fire loss occurs within its borders that the companies will make good the loss claims against them however large those losses may be. Therefore, no single state should be dealt with alone in deciding whether or not its business yields more or less than a normal or fixed rate of profit. For that purpose the experience of all the states for an agreed term of years must be grouped into one account in order to obtain a fair average.

The state laws referred to usually contain a formula for computing underwriting profit or loss and provide for a reduction in rates when the profit exceeds the lawful limit, but the question is one not susceptible of settlement within state lines. It is much broader. As a national question it must be settled by agreement between state authorities and the companies in organization having national jurisdiction. Therefore, if a settlement of the question of a ratio of underwriting profit is reached it must, to be successful in operation, be national in its scope, and in agreement upon the following points:

1. The term for which each computation shall be made.
2. An agreed method for computing underwriting cost in toto and in ratio, which shall cover the fire insurance experience of the companies for each state and for the United States. Provision must also be made for a method of dividing excessive losses occurring in one or more states—as in the case of conflagrations—between all the states.
3. The ratio of margin above underwriting cost which shall be allowed the companies for profit.
4. The manner in which the ratio of profit shall become uniformly effective in all states and in every rate.

As to the *first*: The experience for not less than 10 years should be used for the first computation and from the costs so ascertained it may be determined whether rates should be reduced or increased in order to assure to the companies the agreed ratio of profit. Thereafter underwriting costs should be reviewed from time to time—say every five years—from a cumulative experience of the preceding years until a twenty years' experience is available for furnishing the facts which would decide if and when a change in rates should be made to maintain the level of profit as agreed upon. (See page 11.)

The *second point*, the method of computing underwriting costs, is one which should be worked out in manner as presented in the following table:

TEN YEARS' FIRE UNDERWRITING COSTS
IN THE UNITED STATES

Losses

Losses incurred for 10 years, 1910-1919 incl....\$
Add losses to occur after December 31, 1919,
upon risks previously written, estimated at
50% of unearned premiums.....\$

Deduct losses incurred in the 10-year period
under policies written previous to January
1, 1910,¹ estimated at 50% of unearned
premiums December 31, 1909.....\$

Losses incurred upon the writings of 10 years'
business\$

Expenses

Expenses paid for 10 years, 1910-1919 incl...\$
Add estimated expenses incurred before but
paid after December 31, 1919.....\$

Deduct expenses estimated ² December 31,
1909, but paid in subsequent years.....\$

Expenses for 10-year period.....\$

Summary—Underwriting Costs

Losses as above.....\$
Expenses as above.....\$

Total.....\$
Add for profit 5% of total selling price.....\$

Total 10-year premiums (cost plus 5%)
should have been.....\$
(to be compared with)
Total Earned Premiums actually received.\$
Excess or shortage of profit.....\$

¹It is *practicable* to make this sum exact, instead of estimated.

²It is preferable these should be exact and not estimated.

The foregoing method for determining the costs of underwriting in the United States should be likewise employed in determining costs in each state and their correctness would be proven when the aggregate of such state costs equalled the amount of the costs of the United States.

In regard to conflagration or other excessive losses. Each state should share proportionately in every such loss which exceeds a uniform percentage of the annual premiums of the state where the loss occurred, to be applied in manner as set forth on page 45.

As to the *third point*, ratio of underwriting profit: General agreement seems to have been reached by approval of a 5% profit.

The *fourth point* to be considered is the manner in which the agreed ratio of profit shall become effective in all states and upon all risks. No plan as yet appears to have been agreed upon and made public for meeting this most essential requirement. The method of rate-making advocated in the "Experience Grading and Rating Schedule" will fully meet this condition. Unless adequate and practical provision is made therefor, no agreement for a single state or for the United States can be more than ethical.

For obtaining the *ratio* of underwriting cost as well as the ratio of selling price based upon a 5% profit, the Writings for the 10-year period should be computed in manner similar to the computation of Losses and Expenses, as follows:

Writings

Total writings for ten years, 1910-1919 incl. . . .	\$
Add writings outstanding December 31, 1919.	\$
	\$
Deduct writings outstanding and in force	
January 1, 1910.	\$
Total writings to be used as a divisor for obtaining ratios of underwriting cost; and premium (cost plus 5%)	\$

The average rate (cost plus 5%) upon the business of the *United States* having been ascertained, also the average rate (cost plus 5%) of the business within each *state* (such average rates being derived from a five or ten years' experience) every average *class* rate (cost plus 5%), when applied to a specific risk, would be increased or decreased in the proportion that the average rate of the state in which the risk is located bore to the average rate of the *United States*. (See page 121.) *In no other way* can a consistent policy of 5% profit be maintained and bear equally on state, class and risk.

It has been claimed that interest income derived from a company's unearned premiums is a part of underwriting income and should be treated as such. Such a claim is unsound. Premiums when once paid to the company or its agents become the property of the company and the reserve to meet the liability of premiums unearned is furnished by the *company*, not by its policyholders. The actual interest income derived by the company upon its unearned premium reserve is small, for about one-third of a year's premium income lingers in uncollected premiums and cash in bank—neither of which has reached the investment stage and most of the remainder has been paid out for losses and expenses. But whatever that income may be (and it is not easily determined) it is clearly the property of the company as much as the principal upon which that interest is earned, and the policyholder has neither a legal nor an equitable interest therein either direct or as a means of reducing the cost of his insurance. Were it otherwise, the conditions of the policy contract would give due recognition thereto.

The question is, however, constantly recurring and insistent arguments are presented in favor of the theory that the interest income which a company derives from its unearned premium reserves belongs in effect to the policyholder and as such should be applied as a credit to the cost of his insurance. Such a theory is undoubtedly based upon

the fact that the policyholder pays his premium in advance for a definite service, and until the policy has expired the service has not been rendered and the return of such portion of the premium as has not been earned may be demanded by him. It is because of such prepayment that a reserve is required to be maintained by the company as a guarantee to the policyholder of the return of his unearned premium *in the event* of cancellation of his policy. The fact that the premium is paid at the commencement of his policy instead of at its termination does not alter the fact that the premium is a payment for "service," that it becomes the property of the company when the contract is assumed and the policyholder has no rightful interest therein beyond the right to a return premium in case of cancellation as stated in the policy.

As it is sometimes asserted that there are "hidden profits" in the unearned premium reserve, it is well to consider what that reserve represents to its owner—whether it be the company that originally wrote the policies or another company that may have taken over those reserves by re-insurance.

The *expense* paid out by the company in acquiring the business represented by the unearned premiums forms a part of that reserve notwithstanding the company is required to charge itself for the full unearned without taking credit for any expense that the business has cost. That expense will average at least 40% of the unearned. In foreign countries companies are unrestricted in this matter. Canada indirectly recognizes the cost of the business by requiring its domestic companies to maintain only 80% of their unearned premiums as a reserve.

Again, the *losses* expected to occur under the policies represented by the unearned will average in amount not less than 50%, though they may absorb a much larger ratio or even exceed the entire reserve fund.

Finally, the remainder of the reserves, if any, represents

"good-will" consisting of the value of the agency and brokerage connections for renewal purposes which the control of those reserves usually carries with it. The value of that "good-will" may average 10% and sometimes more.

It will be seen, therefore, that the cost to the company of building up a business represented by its unearned premium reserve as well as the "good-will" which it contains, cannot be less than 40 to 50% of that reserve. For the successful company doing a continuously progressive business, if its risks which the reserve fund represents expire without a heavier loss than say 50% (dependent upon its quality and the absence of conflagration losses), an increase in its surplus will eventually be realized through the earning of a so-called "hidden profit"—be that profit much or little—for the amount is wholly problematical. Its realization is at the mercy of the loss account and may be reduced to the vanishing point, or even worse, by excessive losses.

If a company wishes to retire from business and reinsure its outstanding risks with another company, it expects before paying over the unearned premiums to the company assuming its risks to receive a commission allowance or reduction sufficient to reimburse it for expenses paid out in acquiring the business and for its good-will.

The value of the unearned premium reserve of companies differs much. Instances have been known where the company taking over the business of another company would assume the entire liability without requiring payment of any part of the reserve because of the excellent character of the business and the valuable business connections which its ownership would bring. On the other hand, many companies have retired and sold (or reinsured) their reserve liability to other companies but have been able to obtain little and in some cases no reduction from the amount of their unearned premiums in recognition of expense and good-will because the quality of the business was poor and the good-will practically valueless.

Experience shows that the company reinsuring the entire business of another company usually makes no direct profit thereon because the allowance made for expense and good-will, with losses, more than absorbs the unearned premiums. In an aggregation of results of reinsurances of twenty or more retiring companies it was found that the reinsuring¹ company sustained a loss upon the direct transactions. Therefore, whatever advantage accrued to that company was obtained from the business connections, agency and brokerage (otherwise good-will) which were acquired through such reinsurance. It should be evident that the unearned premium reserve contains no *certain* "hidden profits" which the company can realize *unless it retires from business* and sells its reserve to a reinsuring company; but retirement from business as a means of realizing that profit is a course that no prosperous company would care to follow.

Those who are in doubt as to the meaning and purpose of the reserve liability that fire insurance companies are required to carry (which reserve is variously designated as Unearned Premium Fund, Reserve for Reinsurance, Unearned Premium Liability, Reinsurance Fund, etc.), are referred to the statutes of the several states bearing on this subject, scarcely two of which are precisely alike but some of which are as follows:

New York and *Oregon* describe this reserve as "Unearned Premium Fund" and an "Unearned Premium Liability" respectively.

Massachusetts' statutes read: "To determine the liability upon its contracts of insurance . . . the amount that such company shall hold as a Reserve for Reinsurance."

Mississippi's statutes read: "Actual unearned premium as a legal reserve to protect the holder of its policies in this State."

¹ This was within the author's own experience.

Wisconsin and *Utah* describe the reinsurance reserve as: "The amount required to reinsure all outstanding risks."

Several states have no statutory requirement for the maintenance of a reserve. Many, perhaps most, refer to it as a "Reinsurance Reserve" but deal with it as an "Unearned Premium Liability." That liability (or liabilities) is based upon the premiums in force at a given date; some states requiring 40% of the amount, others 50% and the greater number requiring 50% of the annual, and pro rata of the long terms. Undoubtedly the original purpose in establishing this reserve, or liability of a company, was to fix a sum that it would cost to reinsure its business with another company if retirement from business became necessary, but no discount was permissible from the amount of unearned premium because of the varying desirability, both at times and of companies.

No liability exists for the return of unearned premium to the assured except when cancellation of a policy is required by the policyholder or the company. Only about 20% of policies written are ever cancelled. No record exists of a company retiring from business and paying to each and all of its policyholders their unearned premiums, but hundreds of companies have retired from business and reinsured their outstanding risks with other companies.

No liability exists for loss until fire actually occurs, therefore no liability can be charged to the company as of December 31 upon existing policies for losses to occur thereafter, though the certainty of their occurrence is much greater than of cancellations; yet liabilities for the *total* amount of unearned premiums, 80% of which are never required by or for the assured, is a legal requirement but none is required for losses *to occur* upon the self-same policies.

It will be noted that both of these so-called liabilities are of future origin and not a present fact at the time the company makes its annual statement. Nevertheless, for

full protection to the policyholder the company should be required to carry sufficient reserve for a reinsurance of its business with another company in good financial standing. It would seem for this purpose that a reserve of 50 to 75% of the unearned premiums would be ample and thus remove all doubt of a so-called "hidden profit" in the reserve.

IX

THE THEORY OF GRADING

AND ITS USEFULNESS IN RATE-MAKING

The word "Grading" as here used, means the culling out or separation of risks according to quality, a classification of risks of the same occupancy into groups according to desirability.

Fire insurance companies classify their business according to occupancy only, never having attempted, concertedly at least, to separate the risks in a given class into grades of quality.

Grading is such a common necessity in the merchandising of goods, such a universal practice in every business except fire underwriting that any discussion of theory or practice of grading even as applied to the statistical work of fire insurance would seem superfluous.

The fire underwriter is careful to grade his price estimates for the indemnity which he sells because competition compels him to do so, but in the goods which he buys with his policies (i.e., risks) he makes no attempt to sort them out beyond following certain generic rules which prevent him from mixing chemical works with candy factories or tobacco with bakeries.

On the contrary, as he pays for them he (figuratively) throws his printing offices into one big heap, regardless of whether they were good or bad, treating in the same manner each of his other classes, but without knowledge as to whether in their *detail* those transactions were profitable or unprofitable to himself, or fair to his customers.

Therefore, until the statistics of fire underwriting experience furnish the average costs of *varying qualities*—which must be done by some grading system—classified

experience will possess but little value and fire insurance rates must remain as now the outcome of judgment or estimate and not of actual cost.

Writings and losses when classified by occupancy alone furnish but a single ratio of loss-cost in each group and such ratio is to the risks embraced in the class as a composite photograph would be of many people, for into the average ratio has been blended the characteristics of risks, good, bad and indifferent in quality, some of which are exposed and others unexposed. To subdivide these individual differences of quality and exposure into a fixed number of grades would be an innovation in fire insurance statistics, but it can be accomplished by making those gradings a part of the classification formula. The fire underwriter year after year may have wondered (if he gives the matter consideration) why it has been impossible to obtain such information from his own experience as would definitely point the way to the fixing of his prices and prove to himself, and to the world if need be, that not only was he dealing fairly and not "profiteering" but that his prices were predicated upon actual experience costs. Whenever he has attempted to gather and combine his own and others' experience for that purpose (and those attempts have been rare) the results have been fruitless and he has become more and more confirmed in his belief that fire underwriting is without the fundamental conditions necessary for ascertaining real costs. His salesmanship has been wonderfully good, quite on a par with that of other successful businesses, but his office methods have been unscientific. Harried in times past by legislation unfriendly in its effect if not in purpose and sometimes by requirements of insurance departments, his attitude with respect to the supposed secrets of his business has at times been one of reticence and possibly with a purpose to conceal as far as possible from his fellow underwriters, as well as the public in general, knowledge of his own underwriting experience. No other explanation would seem to account for his unwillingness to join hands with

his fellow underwriters and determine in a scientific manner the factors which enter into and make up the cost of insurance; for some there are who believe that the combined underwriting experience of the stock companies as now being gathered by the National Board is an exposé of their business secrets which should be discouraged, and others that the groups of classified experience when completed will have little value for rate-making purposes—at least sufficient to justify the great cost of the undertaking to the companies.

The latter class is thus convinced by the fact that only an average rate, representing an average of all varieties and conditions of risks in any one class, can at present be obtained from classified experience. Thus far the companies have proceeded on the assumption that when they have grouped grain elevators into one class, a like separation given to the schoolhouse, the department store, the dwelling and each other occupancy hazard, without regard to grade of quality or character of surroundings, they have touched bottom with their underwriting experience and reached the end of the road of scientific determination.

Grading as now proposed would be nothing more nor less than an *extension* of the Standard Classification of Occupancy Hazards. The result now obtainable from each class group is but one average fire cost of the risks in that class without distinction being given to the good, bad and indifferent. Classification of fire insurance experience has never been carried beyond that point, and therefore has as yet no practical value for rate-making purposes. The classification system of the National Board was inaugurated with the object of "securing uniform and combined experience of value for rate-making purposes."

The grading system will divide each occupancy group into as many groups of quality from best to poorest as may be agreed upon and thought necessary. Thus graded, the underwriter as well as the rate-maker would know the average fire cost of the excellent, the good, the average, the

indifferent and the poor risk in every occupancy class and under any one of the ten grades of public protection. Such information is essential for the production of experience-made rates, even if the subdivisions of quality be limited to the five named.

Exposure hazard must also be separated by means of gradings, for its fire cost is unknown because exposure costs are now blended with the costs of inherent hazards. Between the *best unexposed* risk and the *poorest exposed* risk, *now unseparated in one class*, there may be a difference in fire cost of ten to one or even more. If underwriting statistics are to have real value and be made available for a rate-making system, if rate-making is ever to be made scientific and rates are to be derived from a provable cost, some system must be adopted for separating these various hazards of quality and of risks, exposed or unexposed (now contained in one group), into their respective units.

It is an interesting fact that all present rating schedules are in a sense grading schedules, for the estimates of cost which are used to produce rates, grade the price to be charged high or low as risks vary in quality. Such rate is made, however, for the sole purpose of fixing a price to be charged by the company to its customer, but it has no useful purpose in the classification system for obtaining costs. The *grading* schedule determines not the rate but the *grade* of the risk by which it shall be classified and this grade should find its position in the classification formula given to each risk.

Some of the important features of this proposed grading system have been in use by a few companies since 1900 and an example of the costs so obtained in a specific class will be found upon the following page¹—each risk, having been classified as to occupancy, was graded both as to quality and exposure. The record of experience in writings and losses as shown in this table represents thirteen years' experience covering the writings of over twelve hun-

¹ This Table appeared in the 1915 edition of this work.

ILLUSTRATION OF THE EFFECT OF SUBDIVIDING THIRTEEN YEARS' ACTUAL EXPERIENCE UPON UNEXPOSED SPRINKLERED PRINTERS AND LITHOGRAPHERS INTO FOUR GRADES OF QUALITY BY STATES.

	PRINTERS AND LITHOGRAPHERS			
	SPRINKLERED—UNEXPOSED			
	1 <i>Good</i>	2 <i>Fair</i>	3 <i>Indifferent</i>	4 <i>Poor</i>
Maine.....	.221	.410	.686	1.236
New Hampshire.....	.132	.245	.409	.738
Vermont.....	.169	.312	.522	.942
Massachusetts.....	.133	.247	.413	.744
Rhode Island.....	.107	.193	.323	.582
Connecticut.....	.110	.203	.342	.613
New York.....	.097	.180	.302	.544
New Jersey.....	.117	.217	.363	.654
Pennsylvania.....	.140	.259	.434	.782
Delaware.....	.094	.174	.291	.525
Maryland.....	.262	.486	.812	1.464
District of Columbia.....	.066	.122	.204	.369
West Virginia.....	.199	.368	.616	1.111
Virginia.....	.184	.340	.569	1.026
North Carolina.....	.165	.305	.510	.920
South Carolina.....	.175	.325	.543	.979
Georgia.....	.172	.319	.534	.964
Florida.....	.288	.532	.891	1.605
Alabama.....	.246	.455	.762	1.374
Mississippi.....	.265	.490	.819	1.478
Louisiana.....	.188	.348	.583	1.051
Ohio.....	.143	.264	.442	.798
Indiana.....	.143	.265	.444	.801
Michigan.....	.160	.296	.495	.892
Wisconsin.....	.168	.311	.521	.938
Minnesota.....	.191	.354	.592	1.069
Kentucky.....	.184	.340	.569	1.026
Tennessee.....	.226	.418	.699	1.261
Illinois.....	.165	.305	.510	.920
North Dakota.....	.261	.483	.809	1.458
South Dakota.....	.186	.345	.578	1.042
Iowa.....	.190	.352	.588	1.061
Nebraska.....	.160	.296	.495	.892
Missouri.....	.147	.272	.455	.820
Kansas.....	.179	.331	.554	.998
Oklahoma.....	.185	.342	.573	1.032
Arkansas.....	.238	.440	.738	1.330
Washington.....	.229	.423	.708	1.276
Oregon.....	.225	.416	.696	1.255
Idaho.....	.305	.565	.944	1.702
Montana.....	.247	.457	.764	1.377
Wyoming.....	.198	.367	.614	1.107
California.....	.462	.855	1.431	2.578
Nevada.....	.270	.499	.835	1.505
Utah.....	.166	.308	.515	.929
Colorado.....	.183	.338	.566	1.020
Arizona.....	.291	.539	.901	1.624
New Mexico.....	.233	.432	.722	1.302
Texas.....	.205	.380	.635	1.145
United States.....	.16	.296	.495	.892
Average of all grades for the United States.....				.285

dred millions of insurance, and the average rates so obtained are absolutely reliable. The usefulness of the grading system is clearly shown by this table, for the class before being graded showed an average rate of $28\frac{1}{2}$ cents, yet after separation into four grades of quality and graded by states, the unexposed printing and lithographing offices range in price from less than 10 cents for the good to more than \$1.50 for the poor—a difference of fifteen to one! Why, then, should a risk of this description but graded as “poor” if located in New York State be written at an average rate of $28\frac{1}{2}$ cents when its real value according to quality and location is 54 cents; or why written at $28\frac{1}{2}$ cents in Illinois when its real value is 92 cents; or at $28\frac{1}{2}$ cents in Maine when graded experience shows that it is worth \$1.23? Yet in each instance the graded risk is derived from the blend of $28\frac{1}{2}$ cents for all qualities. Or, if graded as a “good” risk which experience shows is worth only $9\frac{7}{10}$ cents in New York State or $16\frac{1}{2}$ cents in Illinois, or in Maine $22\frac{1}{10}$ cents, why should an average rate of $28\frac{1}{2}$ cents be charged on a risk of this kind wherever located? ¹

The grading of risks has been practiced by the Western Factory Insurance Association since 1897, while the grading of properties and processes in other classes of business to bring out their differing merits or defects is a very common usage.

The United States Department of Agriculture uses score cards in its inspections of dairy and milk plants; many city and state boards of health use a score or grading system in their inspection of markets, restaurants, bakeries and other places where observance of sanitary requirements is necessary to the public health. A similar system is used by certain life insurance companies.

A schedule for grading the quality of Automatic Sprin-

¹The theory that a “standard risk in a standard city” should be rated the same regardless of state location, as advanced in the Universal Mercantile Schedule of F. C. Moore, has never been adopted or carried out in tariff-making; on the contrary, the opposite practice has prevailed.

kler Equipments¹ was adopted by the New York Fire Insurance Exchange many years ago and in modified form has been continued.

The grading tables proposed for analyzing classified experience follow: Each table has a total limit of grading or scoring points of one hundred (100) divided into twenty (20) points each. (See also Charts One and Two, pages 114 and 115.)

GRADES OF QUALITY OF INHERENT HAZARD

In the first issue of the "Experience Grading and Rating Schedule" ten divisions or grades of Quality were proposed, but more extended observation and consideration has led to the conclusion that *five* grades will better serve the required purpose (experimentally at least) and simplify operation. If a test of the system should demonstrate that a larger number were necessary there would be no difficulty in making the change nor would a smaller number than five be impracticable.

The five grades now proposed for risks in every occupancy class are as follows:

First: "Excellent," a risk grading 20 points or less.	Grade	E
Second: "Good," a risk grading 21 to 40 points inclusive	"	G
Third: "Average," a risk grading 41 to 60.....	"	A
Fourth: "Indifferent," a risk grading 61 to 80....	"	I
Fifth: "Poor," a risk grading 81 or more points...	"	P

GRADES OF EXPOSURE

All merchandise or other personal property risks which are graded for quality are subject to their own inherent hazard; a part of those risks, also, have exposure hazard—internal or external, one or both. Buildings are without inherent hazard but are subject to internal and external exposure hazards. Provision must therefore be made for

¹ Designed by E. U. Crosby.

the separation of the three hazards each from the other, which can be done only by grading.

GRADING TABLE

For *Internal Exposure* to Contents or Buildings
(by one or more tenants *in same building*)

A sole occupancy having no internal exposure grade.... 0
(A building without tenants would not be a subject for this schedule.)

When exposing tenants are

Non-hazardous only	1 to 20 points	grade	1
Mercantile only	21 to 40	"	2
Manufacturing only	41 to 60	"	3
Non-Manufacturing only .	61 to 80	"	4
Mixed	81 to 100 or more	"	5

GRADING TABLE

For *External Exposure* to Contents and (or) Buildings

A building or its tenants with no external exposure will be graded..... 0

But when exposed by external properties, grade as follows:

If "Mild"	1 to 20 points	..grade	1
If "Medium"	21 to 40	"	2
If "Heavy"	41 to 60	"	3
If "Serious"	61 to 80	"	4
If Dangerous or Conflagration	81 to 100 or more	"	5

A building has no hazards of its own, but (unless *vacant*) if exposed to fire loss from its own tenants, such exposure would be calculated from the Internal Exposure Schedule. If the building is exposed externally, the External Exposure Schedule would also be used.

The foregoing grading tables for Quality and Exposure constitute the grading system which should be used as an extension to the classification of occupancy hazards and in the order given, in the classification formula.

Example: A wholesale grocery stock would be classified No. 138; in a brick building, B; quality (inherent hazard)

grade excellent, E; exposed internally by mercantile risks, grade 2; no external exposure, grade 0. As thus classified and graded, the classification formula would be 138 B—E, 2—0.¹

The forms of Grading Schedules recommended for use in the grading of risks will be dealt with hereafter as a separate subject.

¹Designation of town class (i.e. public protection) to the individual risk is unnecessary in a classification formula as used in this system.

X

THE ELEMENTAL HAZARDS

Fires are of rare occurrence that do not originate in occupancy; that is, the occupancy by man of space (whether in a building or in the open), whether occupied for storage, for the carrying on of trade or manufacture, or for living or other purposes. Therefore, the first need in experience rating is to learn the true fire-cost of this positive factor: Inherent Hazard of occupancy separated from all extraneous hazards.

For this purpose a separate classification was provided for every occupancy (with but few exceptions) in the "Standard Classification of Occupancy Hazards" of October, 1914. Occupancy hazard is increased or diminished according to the quality and kind of construction of the building in which it is contained. A building has no inherent hazard. *Its* dangers originate either in its own occupancies or from external occupations near; or, in other words, from Exposure, internal or external.

Experience shows that buildings are less susceptible to loss and damage, as a rule, than their contents, and, having a more favorable loss-cost experience, they are usually separately insured. This practice becomes a necessity in a vast number of instances for the added reason that the ownership of building and contents is not one and the same, but the preferential character of building insurance, because of lighter loss-cost is the more valuable reason for the need of separate classification. This preference is shown by the underwriter in his rate estimates which, for buildings under good protection, are from two-thirds to one-sixth of the rates on stocks therein.

The *original* classification of the National Board, therefore, provided separate classes for buildings used for non-hazardous and mercantile purposes and, to a very considerable extent, buildings used for manufacturing purposes, or in brief, provided for a separation of buildings from contents in all cases where practicable, for without such separation the true costs of Inherent Hazard cannot be ascertained because, as already stated, buildings have no Inherent Hazard.

As a building varies from a very poor frame through the different grades of construction and quality to a standard fireproof risk, so its ability to withstand the effects of fire heat increases as its construction improves. But the finest fireproof building when filled with merchandise is susceptible of very serious damage by the burning of its occupancies if the extent of its open floor surface per floor is in excess of its powers of resistance, for there is a limit in this respect with the very best fireproof construction. This hazard of excessive floor area is reduced to a minimum and in many cases is quite neutralized by a complete system of automatic sprinkler protection, for internal protection of the most effective type is found in a standard system of automatic sprinklers. Experience has taught the fire underwriter that a well sprinklered risk belongs in a class by itself and not with another of like but unsprinklered occupancy. For this reason, also *because of wide differences in fire costs between many classes of sprinklered risks*, separate classifications were given to over fifty sprinklered occupancies in the Classification System of 1914. Even that number is less than is used by companies making a specialty of this class of insurance.

Inherent hazard is that danger of loss from fire within a risk which is inseparable from it, regardless of its surroundings. Exposure hazard to a given risk is the danger from fire in other properties near, from which the risk in question is either inadequately or wholly unprotected by interposing barriers or fire extinguishing facilities.

Embraced in the losses of each occupancy class are found not only the losses that originated in and were *inherent* to the occupancy itself, but other losses which the occupancy suffered from exposing tenants or fires originating outside of the building.

Inherent hazard of occupation being the positive factor in fire loss and the place of beginning for more than ninety per cent in *number* of all fires, it is necessary in order that the cost of Inherent hazard be known, that the negative or contributory hazards of fire loss to which risks are exposed from outside sources be thoroughly analyzed and segregated. These Exposure hazards are of two kinds, External and Internal.

A large percentage *in amount* of all losses are what are known as exposure losses, but under no present system of classified statistics can the fire cost of Exposure Hazard be ascertained. Charges made therefor under all present forms of schedule-rating are necessarily the merest guess-work.

It was for the purpose of learning the true relationship between Inherent hazard and Exposure hazard and of the loss-cost of each, that, in the make-up of the Loss Report as prepared by the Actuarial Bureau Committee in 1914, upon which companies report their losses to the Bureau, provision was made for the reporting of information as to "place of origin of each fire," whether "on premises of assured" (i.e. if *Inherent*) or if "on premises of another tenant in the same building" (if from *Internal* exposure), or "on premises outside of the building occupied by the assured" (if from *External* exposure). It was believed by that committee that such information concerning all losses in the United States would furnish a fund of statistical facts for the study of cause and effect of fire loss that would throw light on Inherent and Exposure cost and indicate a proper means for measuring it, provided, of course, the necessary segregation of writings was likewise carried out.

The loss-cost of *Inherent* hazard cannot be known until

the statistical work of the Actuarial Bureau has been much further advanced. That cost will naturally increase as protection diminishes, the extremes being found in the No. 1 and No. 10 grade towns.

The extremes of danger from *Internal* exposure would be fairly represented on the one hand by a tenant and his exposing tenants if contained in a building of poor construction and so located as to be entirely without protection, public or private; and, on the other hand, the same tenant and his exposing tenants being contained in a first-class fireproof building, with good facilities of its own as well as the public protection of a first-class city, or standard sprinkler protection. In the first instance the charge for Internal exposure might be the larger part of the sum of the inherent loss-costs (when known) of the exposing tenants, while in the second case the danger from the exposing tenants would decrease nearly to the vanishing point and perhaps be entirely negligible.

The cost of *External* exposure hazard is more difficult to analyze than Internal though it springs from similar causes, viz., Inherent hazard of near-by risks. The limit of distance of External exposure is a question upon which there may be a wide difference of opinion among underwriters, but it is the author's belief that the Exposure grading schedule should cover no more than one hundred (100) feet from the risk being rated, but exposure beyond that distance if important should carry the grade representing conflagration hazard; there would then be an accumulation of experience as to conflagration cost which in due time would be of the greatest value.

For *class* experience, exposure losses like all others are allotted to their several classes and thus all classes so involved bear specifically their direct share of conflagration cost. No class should escape responsibility for the losses which it may suffer, wherever or from whatever cause those losses originate.

For *state* records, the losses by conflagration exposure should be divided pro rata between all of the states.

The losses by four great conflagrations—Bangor, Baltimore, San Francisco and Yazoo City—when spread over the entire premium record of the United States for the ten-year period 1900-1909 amounted on the average to about 12 cents per \$100 of risk. Although not more than seven or eight conflagrations occurred in the United States during the period for which statistics are given in pages 46 and 47, the conflagration hazard existed, and still exists, in nearly every town and city throughout the country.

XI

THE HUMAN EQUATION

The computation of fire insurance rates has always been predicated upon physical conditions alone, though the insurance company covers willingly or unwittingly the human hazard in many phases.

The Commercial Credit and the Fire Record, if any, of the party whose property is being rated, *should be given equal consideration* with physical conditions, for, as now, even though a party has very poor credit, with or without a bad fire record, his insurance rate is the same under like physical conditions as that of the party who has had no fires and has a high credit rating.

The latent forces of moral hazard are present wherever unfavorable circumstances exist.

Conditions may arise that weaken the desire of the man, or his firm, to continue the business. There may be personal quarrels, labor troubles, dissolute habits, family feuds or secret difficulties unsuspected by even the interested observer. Such conditions are potential moral hazards wherever they exist. It is only moral stamina, the fear of God or of man, that controls and prevents their development into criminal carelessness or worse.

It is these and similar conditions that the mercantile agency records in various gradations as made apparent through financial investigation, the possibilities of which the credit man measures and determines the extent to which he will trust his customer. The same conditions operate to make the owner and his property desirable or otherwise to the fire underwriter. It therefore behooves the latter to measure those conditions by rate as well as by acceptance.

To ignore them is to accept an inadequate premium and gamble upon possibilities; to deal with them wisely is almost in itself a guarantee of personal success.

The underwriter is wont to say "moral hazard can never be measured in dollars and cents," while admitting its existence and its serious importance, but he overlooks the fact that in his own loss department in part, and in the loss department of the Actuarial Bureau of the National Board as a whole, is contained indubitable evidence of the actual fire cost of moral hazard in its every form.

Not only is that fact a veritable "lead" but it points to the Bureau's loss records as a veritable "lode" of information which needs only to be brought to the surface and "assayed" to make it of the greatest value to fire insurance interests.

The axiom of the credit man in his measurement of the financial worth and reliability of his customers is "Capital," "Credit," "Character," these three, but the greatest of these is "Character," and that rule of measurement is as important to the fire underwriter as to the merchant.

If called upon to decide between two parties, the one with large financial resources but with "limited" credit, and the other with smaller resources but with "high" credit, the decision of the credit-man is instantly in favor of the latter. The choice of the fire underwriter would undoubtedly be the same as the credit-man's, but his inconsistency is shown by the fact that, with the *physical* conditions the same in both cases, his price per \$100 for insuring the one would be the same as the other even though the fire-cost of insuring the grade to which the man of "limited" credit rightfully belongs is much the greater.

Is it quite just to the party having a first-class financial rating and a property in first-class condition that proper discrimination in price is not made by the underwriter between the two?

In actual experience the fire underwriter finds that his

customers with a poor mercantile record will yield a higher loss ratio than those having a high credit; hence it is believed that just recognition of credit grading, whether extremely good or very poor, should be given in the class-grading of the risk and through that source the corresponding loss or fire-cost.

Of equal or greater importance is the Fire Record, if any, of the party being rated—especially if he has experienced one or more questionable fire losses from causes inherent to his own property. In such cases his grading should surely be increased so that he, with such losses in his record, would be classed in the lower grades of quality, say “Indifferent” or “Poor.” This must be self-evident, for it is he and such as he that have contributed to, if not been chiefly responsible for, the higher loss-costs in those gradings. Therefore, he should not be given as favorable a class-grading as his competitor with good financial standing and a record free from fire loss even though their respective properties may be *physically* alike.

In no one direction can the fire insurance company do more effective fire prevention work than in this, for if the would-be assured and applicant for credit knew that the happening of a fire upon his premises might increase his rate of insurance and likewise impair his credit (even if causing him no more serious disadvantage), such knowledge would prove a very definite check upon many a careless insurant and sometimes upon a possible incendiary.

A rating system thus carried out would place every insurer in such grade of quality as his financial and fire record entitled him to, and also place the fire grades of Quality in each occupancy class in their just relationship one to the other, because it would assign the party with poor credit and (or) a questionable fire record to the class or grade representing a higher loss ratio than if he were free from those objections. At the same time it would relieve those in the higher grades of quality—“Excellent” and “Good”—

from losses for which they were not responsible and the parties whose rates were computed from those better grades would thus escape an overload of loss-cost which should not rightfully enter into the cost of their insurance.

XII

COINSURANCE

When a system of rate-making founded upon combined underwriting experience is adopted and made effective throughout the United States, rates will be more favorable where coinsurance is in use than in localities where it is not required, and the reason therefor is plain. The more nearly the amount of insurance approaches the value of the property insured the lower proportionately will be the average rate, and as this system is dependent upon the average rate of the United States and of each individual state, larger insurances to value, such as coinsurance tends to produce, will yield the lower average rates—and these in turn will lower the loss-cost ratios from which experience rates are derived.

In the event of the adoption of this system, opposition to the use of the coinsurance clause would diminish as rapidly as the citizens of a state learned that its effect when in general use would be to decrease the average rate—such decrease in state as well as class loss-costs operating directly in favor of the policyholders of such state. Could this once be made evident to the legislators of a state that a decrease in average rate of insurance of even one-quarter to one-half of 1% would be the effect of coinsurance if in universal use, legislation, if any, adverse to the use of the clause would in all probability be repealed. Those most interested in the question of insurance to value are the policyholders themselves, and it would be directly in the public interest if a campaign of education could be inaugurated to prove to them that the absence of a uniform requirement of 80 to 100% coinsurance in all fire insurance policies is the

cause of much unfair discrimination against those who insure their property for full value.

Where state law forbids or custom restricts the use of average or coinsurance conditions in the fire insurance policy, there the cost of insurance is most unevenly and unjustly apportioned. In such states the business men who carry full insurance upon their property, and others whose mortgage or other obligations *compel* them to insure to full value to protect their creditors, are at a great disadvantage with those whose insurance policies are free from coinsurance conditions and whose means enable them to insure their properties for a *very small* portion of their value; thus throwing an undue proportion of the cost of fire loss protection upon those who fully insure. Were state and municipal taxation to be levied in a similarly uneven manner, correction of such an injustice would be demanded at any cost necessary.

The universal practice in continental Europe is to limit the amount which a party may recover for fire loss under his insurance policy to not exceeding that proportion which the amount of his insurance bears to the value of the property insured.

Let the same restriction regarding the amount collectible for loss which prevails in Europe become the universal law or practice in the United States and, other conditions remaining the same, the average rate of insurance instead of being 1.03 (or thereabouts) per \$100 (see page 9) would be reduced at least one-third—those now carrying insurance to the full value of their property being benefited by a corresponding reduction in its cost, while those underinsured would be compelled and justly so to make up the difference.

The man who wishes to burn his property to recover upon his fire insurance will, if possible, obtain full insurance; but, as observed by underwriters, full insurance of itself is rarely, if ever, the cause of incendiarism.

With this rate-making system in full effect, what would be the first thought in those states where the state rate was above the average? To devise ways and means for reducing same?

Such result could readily be accomplished by legalizing a uniform average or coinsurance clause of 90% or 100% to value, obligatory upon every insuring citizen, for by this system all ratings of a state would be controlled by the state key-rate. As that rate is high or low, so would every specific rate be proportionately high or low; hence the importance of having the state rate made as low as possible through such legislation as would tend to reduce the ratio of loss and expense outgo to value in the state.¹

When experience rate-making becomes the accepted method of the fire insurance companies and is placed in operation, the use of the coinsurance clause, in whatever form it may now be required, should be upheld in every practicable way and its more extensive use encouraged.

Under the system of the "Experience Grading and Rating Schedule," a continuance of a coinsurance requirement wherever now in use of at least 80% of the value could be readily carried out through the state key-rate when applied to a specific risk, by requiring a higher key-rate when the policy is written without the required coinsurance clause than if the clause is used. Thus, if the key-rate for New York (see table, page 120) were .751 and that rate is increased to .90—provided the policy contained no coinsurance clause—the net rate (as shown in example page 121) would be 1.00 *without* coinsurance, or as now .834 *with* coinsurance. The larger key-rate is reached by adding 20%

¹"Of all the clauses in use the coinsurance clause is probably less understood and the reasons for its requirement less appreciated by the public than any other. As a matter of fact, if the use of this clause could be enforced by law on every policy issued it would be the quickest and most effective way of ultimately bringing all insurance rates to the lowest equitable level which could be maintained by the companies with consideration to the continued safety of their existence."

—Extract from Report of the Pennsylvania Legislative Investigating Committee, Harrisburg, Penna., February 8, 1915.

to the key-rate produced from a 5% profit basis. This would be susceptible of ready adjustment.

As a tentative measure, the table of key-rates for the states (page 120) has been prepared with the two rates.

Other methods for dealing with the coinsurance question might be:

First, a legal requirement for its use; but statutory coinsurance is unlikely to be realized for many years to come, if at all.

Second, additions made to the rate charged which would take into consideration the percentage of insurance to value.

Third, a flat charge for the absence of a guarantee of adequate insurance to value, the same price to be charged whatever the rate might be. This third plan has much in its favor, and would be a most effective way of dealing justly with this perplexing question. Such a charge might be, for instance, 50 cents.

It is a well recognized principle that the poorer the risk in itself and the less protection, public and private, with which the risk is favored, the less is coinsurance needed. On the contrary, a risk which in quality and protection is substantially a standard or perfect risk most needs a coinsurance clause as a condition of the insurance written thereon. If the risk be a low grade planing mill without protection, located in either a No. 1 or No. 10 town, the rates would likely range from 5% to 10%. An addition of 50 cents for lack of coinsurance to the rate upon either of these risks would be the equivalent of a 10% charge to the first and a 5% charge to the second rate. If the risk were of the other extreme in quality, say a fireproof sprinklered risk, of mild hazard, rated perhaps 5 cents per annum in a No. 1 city or 20 cents in a No. 10 town, such charge would in the first case produce a 55-cent rate, equivalent to a 1000% charge, or in the other case would produce a rate of 70 cents, such charge being the equivalent of 250%.

It would be difficult to persuade a trained fire underwriter

that in the case of the planing mill the absence of the co-insurance requirement was of material consequence, or in the second case that the charge for lack of coinsurance was too high. In some instances even that charge might be inadequate.

This plan of measuring the value of coinsurance to a given risk has never been tried out, but it is believed it would be the simplest, most effective and correct measurement of the value of coinsurance that could be used.

XIII

ANALYSIS OF A RATE

In the business of fire insurance all price-making is by the \$100 of insurance which is the factor of measurement. In no other practical manner can prices be dealt with.

The mere statement that a certain amount of premium would be the price of insurance upon a specified property or risk would make little appeal to the seller or purchaser of an indemnity contract. The price per \$100 is the required fact and upon this factor is based all consideration of cost and selling prices.

To reach such a price intelligently, knowledge of the elements which make up that price is essential, viz., loss or fire-cost, expense and profit; and to obtain ratios of these factors, the amounts insured (called writings) are indispensable.

A risk is a specific property insured and for insurance thereon a premium is charged at a given rate per \$100. The premium is made up of three elements, being the proportionate charges for *expected loss*, *expense* and *profit*. The average rate for the United States as produced from ten years' experience of the stock companies for the years 1910-1919 (see page 9) was \$1.03 per \$100 of insurance, and that rate, like the gross figures from which it was produced, consists of $56\frac{5}{10}\%$ loss-cost, $38\frac{5}{10}\%$ expense-cost and 5% profit. Inasmuch as the expense-cost in recent years has increased—which for the United States and all companies now exceeds 40%—while the loss ratio has decreased, it may safely and more conveniently be assumed that the average rate is now not over 1%. This rate of 1% is composed substantially of 55% loss-cost, 40% ex-

pense cost and 5% profit. It is an average price per \$100 for all classes, in all territories and for all risks, exposed or unexposed, in the United States.

The percentage of the whole rate chargeable to loss-cost will always remain at 55% so long as the cost of expense and profit remains at 45% whether that loss-cost be due to inherent hazard alone or includes internal and external exposure hazard—one or both.

The cost of each of these three factors of hazard in every class and grade will be ultimately known and will then constitute the factor or factors from which the rate will be computed. Reversing the natural order of computation purely for the purpose of the following illustrations an arbitrary subdivision of the loss-cost of 55% is now made between inherent and exposure hazards.

It is assumed that about 60% of all loss-cost is produced by exposure fires and upon this assumption the *average* loss-cost of 55% would as a whole be subdivided by assigning two-fifths to inherent and three-fifths to exposure—internal and external—loss-cost.

Loss-costs are radically affected by protection, but the estimated proportions as stated are believed to fairly represent loss-costs under average public protection in the United States. As public protection is improved the cost of exposure loss decreases. On the other hand, as public protection diminishes, or disappears altogether, as in a No. 10 town, the proportion of loss-cost due to exposure is greater—for exposure hazard uncontrolled is much more destructive than in well-protected cities where exposure fires but rarely get beyond the control of the fire department.

The analyses which follow (page 86) of hypothetical rates on Retail Drugs (Class No. 124) under differing conditions will throw further light on this subject.

This illustration commences with a sole tenant risk unexposed. Assuming the risk would be worth a rate of 50 cents if located in an *average* city (which might be grade

No. 3 or No. 4, though which of the two would constitute an *average* city is unknown), and as 5% of this rate is for profit and 40% for expense, the remaining 55% of the rate, viz., 27½ cents, would be the Inherent loss-cost.

Assuming as in the second grouping that the risk is now externally exposed and rated 1.25, the loss-cost of Inherent hazard being 27½ cents—the profit 5%, .0625, and the expense 40%, .50—the balance of the rate remaining for External Exposure cost is .4125.

The effect of the best protection (No. 1 city) and the entire absence of protection (in a No. 10 town) will be noted, as well as the effect of Internal Exposure when the risk becomes one of several tenants and has also External Exposure.

Thus worked out inversely from the rate to its constituent parts, the residuum of loss-cost after the inherent and internal exposure loss-costs have been provided for, becomes the cost of external exposure. In actual practice the rate could not, of course, be computed until the proper charges for these three factors of loss-cost had been ascertained from experience.

In one of these four hypothetical ratings will be found the constituent parts of *every* rate—whatever the character, occupation or location may be of the risk to which that rate attaches.

By this system of rate-making a rate will consist of not less than the three factors, inherent loss, expense and profit, and none with more than those three factors *plus* internal and external exposure—one or both.

Therefore, as Expense cost is not subject to Occupancy Classification but is applied by percentage as obtained from Ledger Classification,¹ how essential it is that the companies should scientifically demonstrate the actual cost of loss experience in its three phases—a demonstration which presents no material difficulty!

¹ See page 14.

ANALYSES OF HYPOTHETICAL RATES ON A RETAIL DRUG STOCK OF AVERAGE QUALITY

Under varying conditions of Protection and Exposures

FIRST, AS A SOLE TENANT IN A ONE-STORY BRICK BUILDING UNEXPOSED.

	In a No. 1 City	In an Aver- age City	In a No. 10 Town	
Loss-Cost (55%)				
Inherent Hazard	.22	.275	.33	Inherent Hazard only
Expense 40%	.16	.20	.24	
Profit 5%	.02	.025	.03	
Rates	.40	.50	.60	

SECOND, AS ABOVE BUT EXTERNALLY EXPOSED

Loss-Cost (55%)				
Inherent Hazard	.22	.275	.33	Inherent Hazard and External Exposure only
External Exposure	.275	.4125	.55	
Expense 40%	.36	.50	.64	
Profit 5%	.045	.0625	.08	
Rates	.90	1.25	1.60	

THIRD, WITH OTHER TENANTS IN A FOUR-STORY BRICK BUILDING OCCUPIED AS FOLLOWS BUT UNEXPOSED EXTERNALLY

1st Story, Drugs; Grocery		3rd Story, Dwelling		
2nd Story, Printing (with power)		4th Story, Lodge Rooms		
Loss-Cost (55%)				
Inherent Hazard	.22	.275	.33	Exposure only and Internal Inherent Hazard
Internal Exposure	.33	.55	.77	
Expense 40%	.40	.60	.80	
Profit 5%	.05	.075	.10	
Rates	1.00	1.50	2.00	

FOURTH, WITH OTHER TENANTS AS ABOVE AND EXTERNALLY EXPOSED

Loss-Cost (55%)				
Inherent Hazard	.22	.2750	.33	Inherent Hazard with Internal and External Exposure
Internal Exposure	.33	.55	.77	
External Exposure	.275	.4125	.55	
Expense 40%	.60	.90	1.20	
Profit 5%	.075	.1125	.15	
Rates	1.50	2.25	3.00	

XIV

GRADING SCHEDULES

The grading schedule *per se* is not a rate-making device but is designed as a means for subdividing class experience into a given number of grades according to quality.

While the plan of the "Experience Grading and Rating Schedule" was being considered by the Actuarial Bureau Committee of the National Board the grading system upon which it is based received its first endorsement. A proposition for grading the towns and cities of the United States into ten groups according to the quality of their facilities for protection from and extinguishment of fires was approved by that committee, following which a grading schedule was prepared under its direction by the engineers of the Committee on Fire Prevention and adopted. Soon after, changes were made greatly improving the schedule and in its amended form was adopted December 14, 1916, by the National Board and is known as the "Standard Schedule for Grading Cities and Towns in the United States."

This system of grading public protection into ten classes was the first step taken toward the making of rates from combined experience, for the schedule was designed solely for the purpose of adjusting rates according to public protection. It has been already extensively applied and in its practical operation has proven a valuable guide in the scientific classification of cities and towns according to the quality of their protective facilities. Over two hundred cities and towns of more than 20,000 inhabitants in different portions of the United States have already been graded or classified and the work will be continued until every town and city in the United States has been assigned to its proper class or grade. Cities and towns are thus divided into

ten groups—number one grade being the city possessing the highest standard of public protection, of building construction, building laws, etc., followed by numbered grades possessing less desirable features until the town without public protection of any kind is graded number 10. This method of grading public protection should eventually render unnecessary the use of the classification signs "U" (for unprotected) or "P" (for protected). Then losses and writings for the United States class by class could with many advantages be subdivided for average loss-cost purposes into these ten groups of towns and cities—that is, into the ten grades of public protection.

Underwriting experience in all number one cities *regardless of state location* would then be tabulated class by class and grade by grade, for obtaining average loss-costs; the number two towns and cities likewise; and so each of the other eight town grades. All unprotected business wherever located in the United States would be included under number ten town grade. It will then be possible for the first time in the history of fire insurance to determine the ratio of comparative cost of the protection afforded to towns and to risks by public water works and fire departments.

Following such grading of public protection, the next step would be the grading of the *risks* (sums insured) in the United States (see Chart Two, page 115), an immense but not insuperable task, for the existing machinery of the companies represented by the many territorial associations known as Underwriters' Associations, Boards or Stamping Offices and Bureaus already cover quite thoroughly the whole territory for inspection and rating purposes and are well equipped for the work.

Once established, the work and expense of this system would be no greater and probably materially less than present rating systems require.

Each risk when graded would be tabbed with its particular grade of quality and exposure as ascertained

through the application of the grading schedules and when given its proper classification number the tabulator would be able to separate a mass of class experience composed of thousands and perhaps millions of risks into their several classes and grades.

Each loss would take the same grading as the policy under which it was incurred and separation of losses by classes and grades would be accomplished in the same manner as with writings.

At present the classification rules of the National Board require that each risk shall be classified as to its occupancy, material of building and public protection, if any.

Thus a retail clothing stock (No. 114) in a brick building (B), in a protected town (P) is now designated by the symbols 114 B-P. If this grading system were to be added to the Standard Classification, the risk quoted—which might be in a No. 3 town or city, of average quality (A), having no internal exposure (0) but with serious external exposure (4)—would be classified and graded as 114 B-A, 0-4. No designation of protection would then be required in the classification formula because the business of all No. 3 towns or cities in the United States would be tabulated together as one, and so with each of the other nine city or town divisions.

It is the usual custom in the fire insurance office to note upon the copy of every policy issued (i.e., the daily report) the class number, the assured's fire record if any, and if a business concern, a "Dun" or "Bradstreet" report upon the commercial standing of the party. This is required because each has a direct bearing upon the desirability of the insurance offered.

What makes one risk better or poorer than another of the same class and conditions?

Both risks if alike *physically*, would under present rating methods bear the same rate, although the difference in desirability would be due to the difference in the character, financial and moral, of their respective owners. This dif-

ference should be provided for. The two are not entitled to one and the same rate.

As yet the analysis of fire losses has not reached that degree of completeness regarding class, time, location (inherent and exposing) and relative effect as to make their study yield those illuminating conclusions that are needed for use in rate-making. The grading system is an essential means to that end.

Perhaps with such information before him, the underwriter's views regarding loss-producing conditions would be materially changed. The loss record certainly presents a fertile field for the investigator.

In this system of risk-grading, it is needless as well as impossible to give recognition to many theoretical defects now named in present rating schedules. The end sought is to determine as accurately as possible into which of the five grades of Quality each risk is entitled to be placed, because the grades so fixed will be the factors used in subdividing class experience and so lead the way to the average loss-costs of the ultimate units of fire hazards.

The grading schedules which follow are to be regarded in some measure as tentative:

Schedule for grading *Quality* of *Brick Buildings* occupied for business purposes—Mercantile or Manufacturing.

Schedule for grading *Quality* (or Inherent Hazard) of *Contents* (Merchandise or Manufacturing) of Brick Buildings as described.

Schedule for grading the *Mercantile Standing* of an assured.

Schedule of *Charges* for *Fire Record*.

Schedule for grading *Quality* of *Brick Buildings* and *Contents* as described, when classified as one risk.

Schedule for grading *Internal Exposure*.

SCHEDULE

FOR GRADING BRICK BUILDINGS¹ OCCUPIED FOR MERCANTILE OR MANUFACTURING PURPOSES INTO FIVE GRADES OF QUALITY IN 12 POINTS:

Excellent	1—20	Average	41—60	Indifferent ...	61—80
Good	21—40			Poor	81—100

In the construction of this schedule, regard was had to the fact that a building has no Inherent hazard. *Its dangers—save the hazards of lightning or incendiarism—arise from Occupancy hazard within or without, otherwise known as Internal or External exposure. Therefore the grading of a building is determined by the probable effect to its physical parts of fires in its own occupancies, or from occupancies without but exposing. In grading buildings in reference to their fire resistance and hazards a number of distinct features should be considered, each performing certain functions or exerting certain influences common to all buildings. These can be reduced to the following:*

<i>Walls.</i>	To support floors and divide the structure into fire areas.
<i>Floors.</i>	To separate the structure horizontally into fire divisions.
<i>Chimneys and Flues.</i>	Affect the fire hazard depending on the method of construction and upkeep.
<i>Roofing.</i>	To prevent the escape of fire upwards to the outside within the walls of the building (and to prevent a fire from entering the building by top exposure).
<i>Vertical Openings.</i>	To resist the spread of fire throughout the building, depending on the quality of protection to such openings.
<i>Lighting and Heating.</i>	Affect the fire hazard, depending on the method of installation and upkeep.
<i>Power.</i>	If steam power and furnished with building. Hazard affected by location, character and arrangement of boiler, boiler-chimney and fuel room.

¹ The Author is pleased to acknowledge the important assistance rendered him in the preparation of this schedule by a Committee of Engineers of the National Board.

<i>Special Features.</i>	Condition and repair. These influence the facility with which fire may be propagated and spread.
<i>Area.</i>	Having influence on the strength a fire would develop, depending on size of areas.
<i>Height.</i>	Influences the strength a fire would develop (provided no vertical opening protection exists).

NOTE—Features of construction designed to prevent the entry of a fire from the outside, such as parapet walls, skylights and fireproof protection to openings in external walls, are treated as elements or factors of external exposure hazard to be dealt with in the grading schedule of that hazard. The building as a *grading* proposition is regarded as an isolated problem.

SCHEDULE		Charge in Grading Points
<i>Walls.</i>	Exterior bearing and non-bearing, and party walls. Consider thickness, condition, etc.	
	1—If National Board standard.....	0
	2—If National Board standard as to independent walls; somewhat deficient as to party and fire walls	3
	3—If bearing walls 12 inches thick, 1 story; 8 and 12 inches thick, 2 stories; 4 inches deficient, 5 stories and over. Party and fire walls, 4 inches deficient	5
	4—If all walls, 4 inches deficient in thickness.....	15
	5—If all walls, 4 inches deficient in thickness; poor materials and walls cracked.....	25
<i>Floors</i>	Consider under and wearing surfaces, floor supports, ceilings and fire stops.	
	1—If semi-fireproof or mill type floors; floor beams on bearing walls, metal columns fireproofed or protected mill type posts; metal lath and plaster ceilings where ceilings installed.....	0
	2—If joisted with double floors; floor supports slightly deficient from that noted above; wire lath and plaster ceilings; fire stops O. K.....	5
	3—If joisted with double floors; unprotected metal columns, Lally columns, wooden posts of safe carrying capacity; wood lath and plaster ceilings; fire stops in part.....	10
	4—If joisted with single floors; under-size metal or wood posts; wood lath and plaster or wood ceilings; fire stops occasional.....	13
	5—If light and poorly spaced joists, single floors; wall supports poor or stud partition supports; wood ceiling; no fire stops.....	16
<i>Chimneys and Flues.</i>	Consider thickness of masonry walls, flue lining, supported on wood or hangers, "patent" chimneys, tile or iron flue.	
	1—If National Board standard; good condition.....	0
Carried forward		

<i>Brought forward</i>	
2—If essentially National Board standard; good condition	1
3—If National Board standard in thickness, but not lined, fair condition.....	2
4—If four-inch masonry walls, not lined and in poor condition	4
5—If poor construction, location and condition.....	7
<i>Roofing.</i> Consider construction of supporting surface of roof covering, and the relative fire-resistive qualities of the covering.	
1—If brick, concrete or tile covering.....	0
2—If slate or 4 or 5-ply pitch felt and gravel roofing	1
3—If tin, asbestos shingles, or 3-ply pitch felt and gravel roofing.....	2
4—If asphalt-rag-felt prepared roofing or shingles, approved by Underwriters Laboratory.....	5
5—If wood shingles.....	15
<i>Vertical Openings.</i> Consider protection to stairways, elevators and other floor openings.	
1—If all floor openings have enclosures equal in fire resistance at least to that of floors.....	0
2—If all floor openings have enclosures equal in fire resistance at least to that of one inch wood partitions	7
3—If elevators with good automatic traps or equivalent, where present; floor openings otherwise unprotected	15
4—If elevators, where present, with non-automatic, wooden traps; no other floor opening protection.	16
5—If numerous floor openings or large light-wells, unprotected	17
<i>Lighting and Heating.</i> 1—If electricity, in good condition; heating from outside source.....	0
2—If electricity, fairly good condition; furnace in building	1
3—If gas, or electricity in fair condition; furnace, stoves or gas heating.....	2
4—If electric or gas lighting poorly installed; coal stoves, or gas heating poorly installed.....	5
5—If oil lamp lighting; oil stoves or gas with rubber tube heating.....	8
<i>Power.</i> 1—If power from outside, whether steam or electricity	1
2—If power inside, but fireproof boiler and fuel room.	2
3—If power inside safely arranged but open boiler and fuel room.....	4
4—If power from upright boiler in open room, iron chimney well arranged.....	6
5—If power poorly arranged, more or less unsafe, at least.....	10
<i>Special Features.</i> Condition and care. Repairs and upkeep.	
1—If excellent.....	0
2—If above average.....	1
3—If fairly good.....	3
4—If poor.....	7
5—If general condition and care poor, building badly run down.....	12
<i>Carried forward</i>	

Brought forward.....		
Total number of deficiency points.....		
<i>Area.</i>	If in excess of 2,000 feet, undivided by fire partitions, for each 1,000 feet in excess, or fraction thereof, add.....	3
<i>Height.</i>	If in excess of 1 story, for each additional story add	2
Total.....		
<i>Private Protection.</i>	If protected by automatic sprinklers with night-watchman and clock, or equivalent.....	
	and sprinkler system grades 100% deduct 90%	
	If " " " " 90% " 80%	
	" " " " 80% " 70%	
	" " " " 70% " 60%	
	" " " " 60% " 50%	
	" " " " 50% " 40%	
	" " " " 40% " 30%	
	If Private Protection of substantial nature, and night-watchman and clock maintained, but without automatic sprinklers, deduct	20%
Total Net Grading Points for Physical Hazard.....		

[illegible]

PHYSICAL HAZARDS

First— <i>Hazards inherent</i> to the Stock and other Contents, which originate fire <i>spontaneously</i> , or influence the spread of fire, much or little according to the <i>combustibility</i> of the Stock, or create loss because of its <i>susceptibility</i> to damage from fire, water, smoke, breakage or otherwise, including other unknown hazards, all of which have produced a fire loss record in its class, the average of which in grading points between the extremes of 1 and 100 is represented in points, by.....	Deductions	Average Risk	Additions														
	Points	Points	Points														
Second— <i>Height</i> . Relative danger of location as to floors. If on first floor with or without basement, <i>deduct</i> 25 If in basement only.... <i>deduct</i> 5. If extending to or located on upper floors, one-half the sum of the following charges for floors which the assured occupies is to be <i>added</i>		50															
<table><tr><td>Basement</td><td>First</td><td>Second</td><td>Third</td><td>Fourth</td><td>Fifth</td><td>for each floor above</td></tr><tr><td>5</td><td>1</td><td>5</td><td>10</td><td>15</td><td>20</td><td>30</td></tr></table>	Basement	First	Second	Third	Fourth	Fifth	for each floor above	5	1	5	10	15	20	30			
Basement	First	Second	Third	Fourth	Fifth	for each floor above											
5	1	5	10	15	20	30											
Third— <i>Area</i> . If floor area in each story exceeds 4,000 feet, for each 1,000 feet or fraction thereof in excess, ... <i>add</i> 10 points If area is less than 4,000 feet in each story, for each 1,000 feet or fraction thereof less, ... <i>deduct</i> 10 points																	
Fourth— <i>Housekeeping</i> . For defects <i>add</i> from 5 to 25 points according to judgment, and the following specifications are to be each and separately considered: Premises as to Care and Cleanliness? Smoking? Cuspidors? (Sawdust?) Ash Cans and (or) Waste Cans—wood, metal, or none?..... Packing and Packing Materials—Well and safely arranged?.... Stock—crowded? Displayed on lines? Gasoline or benzine, if used? How cared for?..... If establishment is faultless in these and all other Housekeeping respects, <i>deduct</i> from 5 to 25 points, according to judgment.... Carried forward.....																	

OCCUPANCY GRADING SCHEDULE—Continued

	Deductions	Average Risk	Additions
	Points	Points	Points
Brought forward.....		50	
Fifth— <i>Operation</i> . If Fire heat is used for other than power, <i>add</i> from 2 to 10 points.....			
If Boiler is on assured's premises, used for heating or (and) power, <i>add</i> from 2 to 5 points. If in respect to <i>Operation</i> , the risk is decidedly better than average and no Boiler or Fire Heat used on premises of assured, <i>deduct</i> 10 points.....			
Sixth— <i>Unusual Hazards</i> not ordinarily found in the "Average Risk" of its class, <i>add</i> according to judgment			
Total Deductions for features superior to Average.....			
Total Additions for features poorer than average.....			
Net points of Physical Grading...			
Seventh— <i>Private Protection</i> . If protected by automatic sprinklers with night-watchman and clock, or equivalent and sprinkler system grades 100% deduct 90%			
If " " " " 90% " 80%			
" " " " 80% " 70%			
" " " " 70% " 60%			
" " " " 60% " 50%			
" " " " 50% " 40%			
" " " " 40% " 30%			
If Private Protection of substantial nature, and night-watchman and clock maintained, but without automatic sprinklers..... " 20%			
Total Net Grading Points for Physical Hazard.....			
MERCANTILE GRADINGS			
Eighth—Grading points based upon the report of Mercantile Agencies, per table (see page 98)..... <i>add</i>			
Total Physical and Mercantile Points.....			
Average of the two.....			
FIRE RECORD GRADINGS			
Ninth—If any (see page 99)..... <i>add</i>			
Total number of Grading Points..			
which places risk in Grade of			
Quality.....			
Symbol			

MERCANTILE GRADINGS

BASED UPON
CAPITAL AND COMMERCIAL CREDIT

<i>Estimated</i>	<i>High</i>	<i>Good</i>	<i>Fair</i>	<i>Limited</i>
	P O I N T S			
\$500,000 and upwards	1	1	40	75
300,000 to \$500,000	1	1	50	75
150,000 to 300,000	1	5	60	85
75,000 to 150,000	5	5	70	90
50,000 to 75,000	5	10	80	90
35,000 to 50,000	10	15	90	100
20,000 to 35,000	15	20	100	100
5,000 to 20,000	20	25	100	100
1,000 to 5,000	25	30	100	100
0 to 1,000	30	35	100	100

If no specific estimate has been made by the Mercantile Agencies, of the wealth and commercial credit of the party whose risk is being graded, the number of grading points which are to be used shall be determined by some central authority—preferably the National Board of Fire Underwriters, and that information furnished to the Rating Boards requiring it.

Symbols used by one Mercantile Agency for designating Capital and Credit being distinctly different from those used by other Agencies, no reference to or use of such symbols is here made. When necessary, however, that omission can be supplied so that the above table will be an effective key for transposing any mercantile report into grading points.

Note.—The above schedule of mercantile grading charges (in points) was prepared after several conferences with representatives of the National Association of Credit Men, and the leading Mercantile Agencies, to whom this plan of averaging the financial standing of a business house with its physical features, for the purpose of fire insurance rating, was submitted and the principle warmly approved.

FIRE RECORD GRADINGS

TABLE OF CHARGES FOR FIRE LOSSES

other than those caused by lightning

Based upon the records of the Actuarial Bureau

- Date.....19.. Date.....19.. Date.....19..
- (1) If Inherent and Normal, add for each fire.. 5 points
 - (2) If Inherent but incendiary, strictly preventable or unknown, add for each fire.....10 points
 - (3) If from Exposing Tenant, add for each fire 5 points
- In addition to the above, for each Inherent loss from strictly preventable, incendiary or unknown causes,
- Add for each loss (A) under \$100..... 5 points
 - Add for each loss (B) between \$100 and \$250 6 points
 - Add for each loss (C) between \$250 and \$500 7 points
 - Add for each loss (D) between \$500 and \$750 8 points
 - Add for each loss (E) between \$750 and \$1000 10 points
 - Add for each loss (F) over \$1000.....12 points

Note.—Letters A to F refer to Code of the Actuarial Bureau of the National Board.

CHARGES
in Points

31740A

The foregoing schedules differ from rating schedules in that they are designed for grading the quality of a risk and not for computing its price or rate. The operation of the Occupancy Schedule begins with an *average* of quality expressed in scoring points, for classified experience which is the foundation of this system of rate-making yields averages only. Its additions and deductions are made in scoring points and not in dollars and cents.

A business occupancy is graded both as to its physical character and the business standing of the owner as reported by the mercantile agency. Each is calculated separately and the grading points thus obtained for the two are averaged. To that average is added charges (in points) for losses, if any, that have occurred in the risk itself or in the same building though on the premises of another tenant. From the total points so obtained is established the grade of the risk.

One must not lose sight of the fact that the basis of 50 grading points in the Occupancy Schedule represents the expectancy of loss from the inherent hazards of the *average* risk in its class than which the "Good" or the "Excellent" are proportionately better and the "Indifferent" and the "Poor" risk are proportionately poorer.

If the risk being graded is better than "Average," thus deserving the grading of "Excellent" or "Good," credits or deductions are given from the 50 points average according to its merits to bring it to the better grade to which it is entitled. If, on the other hand, its defects clearly make it a poorer risk than "Average"—therefore an "Indifferent" or "Poor" risk—points are added to the average of 50 points according to the measure of those defects to bring it into the less favorable grade to which it properly belongs.

It would be impossible to analyze an average loss-cost and discover the losses and their costs that contributed to make that "Average," and so the "Average" grade is given a latitude either way from the basis of 50 points from 41 to 60.

For the same reason a like range of 20 points is given to each of the other grades, thus placing the extreme limits of the best to the poorest from 1 to 100, the average of which—50 points—is made the basis of the grading calculation.

A long experience in grading and a closer analysis of fire losses and their causes will undoubtedly enable the fire insurance actuary of the future to have a much clearer conception of the true lines of separation between the five divisions of quality than is now possible.

In analyzing this Schedule for Stocks or Contents its beginning is:

I. *Inherent Hazard.* The loss-cost of an "Average" risk (and so of the other four grades) includes within itself losses to Contents arising from inherent causes peculiar to its class and grade, produced, it may be, by spontaneous combustion, combustibility or susceptibility to damage; therefore, only such conditions as may be regarded as unusual to the average risk—that is, defects in some and superior qualities in others—are itemized in the schedule for recognition by debits or credits.

II. *Height* as to desirability of location by floors: If the risk being graded occupies one or more floors above the first, one-half the sum of the floor charges as per table is to be added. For instance—if the stock being graded is contained on all floors from basement to the fifth floor, the basis for grading will be one-half of the sum of the grading charges of the six floors, viz., 28. If the first and fifth floors alone are occupied by the risk being graded, one-half of the combined scores of the two floors will be used, viz., 11. The farther from the ground level the tenant may be, the more difficult it will be for the fire department to control

a fire upon his premises. Medium sized cities will average having little better than "four story fire departments," and few fire departments, if any, can deal efficiently with fires above the sixth story.

III. *Area.* A large area of floor surface, say in excess of 4000 feet, filled with merchandise, presents a condition, in case of fire, more difficult of control than if the extent of floor is small, say from 1500 to 3000 feet, and this is especially true in the upper stories of a building. A standard is named of 4000 feet per floor. Less than that amount of space entitles risk to a credit, but if greater, points are added as provided.

IV. *Housekeeping.* Any variation from normal or fairly average conditions is recognized by deductions from the average of 50 points for the better and by additions for the poorer, as more particularly explained in schedule.

V. *Operation.* Conditions better or poorer than average are similarly recognized. Conditions which pertain only to the building or permanent features of the plant will be provided for in the building schedule.

VI. *Unusual Hazards.* It often occurs that a risk whether mercantile or manufacturing will contain some unusual features not common to the class, and for proper recognition of same (unless pertaining to building only) an item has been entered for important hazards not usually found in the class.

VII. *Private Protection.* In recognition of substantial private protection—including automatic sprinklers—if such protection is reënforced by night watchmen or clock or their equivalent, it is provided that the entire sum of grade points for *physical* grading shall be reduced by percentages as stated, according to degree of protection.

VIII. *Mercantile Grading.* The grading charges for the business standing of the party, by whichever mercantile agency the party is reported, are already provided for in a separate table which follows the schedule. To such charge as may thus be made will be added the total scoring points

of the *Physical* grading and the average of the two will constitute the basis of points upon which the grading is to be determined. If, for instance, the average thus arrived at is 50, the risk will fall into the grade "A" (or Average), covered by points from 41 to 60; or, if the physical gradings are 50 and the mercantile gradings 10—the average being 30—the grade will be "G" (Good).

IX. *Fire Record*. This dominant feature of the fire insurance business—the one and only reason for the existence of the fire insurance company—has never been recognized in the computation of rates by charges against those upon whose premises fires originate. (See pages 43, 44 and 76.)

Each rate should be a real measurement of the hazards obtaining or found to exist in the particular property to which it attaches, for it represents the consideration which is paid the company for assuming that particular hazard. Therefore, it is a part of the plan of this rate-making system that all losses upon business risks, except those from external exposure, shall increase the grading charges of the risks being graded and in which those losses occur, according to the origin of the fire or fires. This is made practicable because of the fact that a separate record is made by the Actuarial Bureau of every loss and loss-claimant reported to the bureau.

All losses within the building or the premises occupied by the party being graded are divided into three classes, and charges in points are made therefor as provided for in the Table of Fire Record gradings, page 99.

This method of fire prevention should be at least tried as one very important means of discouraging losses originating from preventable or partly preventable causes.

The grade so established upon a Contents risk, as derived from the physical, mercantile and fire record sources, becomes a part of the classification formula by which the character of the risk is indicated, which formula is to be recorded upon the copy of the policy (*viz.*, daily report) and also upon the tabulator's card.

THE GRADING OF BUILDING AND CONTENTS WHEN
CLASSIFIED AS ONE RISK

It is in some measure unfortunate that fire insurance custom does not require in every case that the building be insured specifically and separately from its contents, even though the ownership be the same, and so admit of their separate classification as well as a separate record of underwriting experience on each, for the experience upon buildings as a rule is so much more favorable than the experience on contents that the blending of the two into one result produces an incorrect record for either. Merchandise and other contents possess inherent hazards, and are subject to the hazards of exposure as well, but the building has no inherent hazard and is liable to damage only from its exposures—internal or external; neither is it as susceptible to damage as its contents.

When building and contents are combined as one, the building can be readily *graded* by itself, also the contents, and then the grading points of each can be blended into one. To secure a just average, each should be on the basis of value, otherwise the average of the two will be inexact.

This blend should be made by adding the total grading points of physical hazard of contents to the grading points of building in proportion to the value of each as stated and the average of the two will represent the net grading points of physical hazard of building and contents, to which the grading points for mercantile record should be added, and the average of the two will give the final grading points of the risk; except if the assured has had any fire losses coming within the requirements of the schedule, charges must be made therefor to obtain the final grade.

The table of grading charges for Mercantile Standing will be found on page 98, and the table for charges for Fire Record on page 99.

THE GRADING OF INTERNAL EXPOSURE

The schedules for grading exposures, Internal or External, will be equally applicable to fireproof and frame buildings as well as brick.

In a frame building the Internal exposure of one occupancy to the other contents is more dangerous than would be the case in other buildings of safer construction.

In a fireproof building this hazard is light and the occasion would be rare when a fire on the premises of one tenant would spread to or cause damage to other tenants in the same building.

Between these two types of construction the brick building and its internal exposures occupy a middle position, but the grading schedule is to be used for subdividing underwriting experience (whatever its amount may be) into grades of quality, and its operation is not affected by these factors of construction.

The hazard of Internal exposure is an intricate one and in a measure elusive, for the combinations of hazards represented by a multiple occupancy are almost unlimited. The problem of grading Internal exposure is hardly less difficult of solution than that of External exposure. Internal exposure, however, involves inherent hazards of different occupancy classes, but it is confined to a single building, while External exposure has no limits either as to hazards or classes of building and scarcely as to distances. At present the grading of the one may be estimated, even if imperfectly, but the manner in which the other should be dealt with is uncertain. Neither can it be satisfactorily determined until carefully prepared experience of writings and losses relating to exposure hazards can be placed in the hands of experts for thorough analysis and well-defined conclusions. At present no combined statistics of underwriting experience of exposure hazard exist. Measurement of its actual cost is therefore impossible as yet, and its present treatment under any existing rating system is and

must be purely guess-work. If the quality of every tenant save one in a building is "Excellent" (E), and the quality of the one exception is "Poor" (P), whether because of poor physical condition, mercantile standing or fire record, the objectionable nature of the one is communicated in greater or less degree to the other occupancies in the same building.

Nevertheless, it is believed that Internal exposure from two or more occupancies can, as a tentative measure, be dealt with fairly satisfactorily by ascertaining the average of their combined qualities; at least this may be done until statistics of experience furnish a better plan.

When the inherent hazard of each tenant has been graded, the "total Physical and Mercantile Points" of all exposing tenants, as found under the eighth item in the respective occupancy gradings of each tenant under that schedule, are to be averaged. To that average sum of grading points should be added five points for each exposing business tenant more than one; also whatever charges in grading points for Fire Record have been made against one or more tenants, the same charge or charges shall be added to the composite grading points thus obtained. From such result the grade of exposure should be determined. The total number of grading points for exposure being 100 and the range of 20 points being assigned to each of five grades (as in Quality grading) the grade to be assigned would thus be clearly indicated.

The chief factors of Internal hazard exposure which must be considered are:

1. The number of tenants exposing; 2, the quality of each and, 3, the varying degrees of fire hazard which would be found in a mixed class occupancy.

The form of schedule now proposed will provide for the cumulative hazard from the number of tenants, also for their average qualities; and, while no specific or direct recognition is given to the fire hazards of the varying class occupancies that are found in tenant buildings, this form

of grading will reflect their general character, while specific charges to the grade for fire record of any one or more tenants will cover an important feature.

This plan of grading is subject to modification when actual experience costs of the Internal hazard are obtainable.

THE GRADING OF EXTERNAL EXPOSURE

For the reasons already given under the head of Internal exposure and on pages 71 and 72, no schedule for grading the hazard of External exposure will be here proposed. It is hoped that the problem will be solved in the early future by an analysis of combined experience, for such solution is entirely practicable and a sure way of measuring this important hazard in a scientific manner.

GRADING SCHEDULES FOR OTHER HAZARDS

The schedules which appear on the preceding pages are for the grading of *brick* buildings and their contents used in trade or for manufacture and for grading their related hazards. Schedules will also be needed for fireproof and frame buildings similarly occupied.

Other schedules in different and probably simpler form will be required for the grading of other classes, such as non-hazardous property, office and bank buildings, also some of the non-manufacturing classes, but the number of such schedules will be small.

In certain cases tables can preferably be used instead of schedules. The preparation of tables and schedules, though matters of important detail, may well be postponed to such time as they are needed. Those already given fully illustrate the grading principles underlying this system of experience rate-making.

As already indicated, the grading schedules herein proposed are necessarily of a tentative nature, for these guides to the subdivision of experience will constitute a most important part of the mechanism of this rate-making system.

Each schedule, like a new watch fresh from the maker's hands, will need careful adjusting, testing and operation in order that changes may be made if required to bring each schedule into satisfactory relations with the several grades of quality.

Underwriting experience, though classified, if ungraded as to quality, is like a storehouse filled with merchandise which has been sorted as to kind but which must be sorted according to quality, in order to make it salable or of practical value.

These schedules will be the means employed for properly dividing that experience or "merchandise." Their preparation should employ the combined wisdom and judgment of the best underwriting talent in the country, for no one person, however competent he may be, could alone prepare successfully and satisfactorily the schedules for grading underwriting experience.

This need of concurrent action and co-operation on the part of underwriters in the making of standard schedules was recognized by the late F. C. Moore, author of the "Universal Mercantile Schedule," who in 1890 called to his assistance three company officials, selected by the National Board of Fire Underwriters. That committee, in co-operation with Mr. Moore, prepared the rating schedules which were finally accepted and adopted in principle at a convention of the companies held in New York, November 29, 30, and December 1, 1892.¹

¹ That committee consisted of F. C. Moore, Chairman (President of the Continental), George W. Babb (Manager of the Northern), James A. Silvey (Secretary of the German American), and E. G. Richards (Secretary of the National of Hartford).

XV

OPERATION

The scientific phases of classification have been dealt with elsewhere in this work, but much is needed to make the classification of underwriting experience thoroughly dependable. In its beginning, the placing of the risk in its proper class is of great importance. The classification formula is usually recorded upon the daily report of the policy written, immediately upon its receipt at the home office of the company. At present that decision is made by literally hundreds of employees in the various insurance offices, a few of whom have had practical experience in fire hazards, but the larger number whose experience is limited to that gained in office work, are not so well qualified to decide the class to which a risk properly belongs.

If the classification of fire underwriting experience be extended to the *grading* of risks, as herein recommended, the essential need of experience in determining the formula for the two will be still greater. It is the author's belief that this initial step in classification work should be decided *not* in the companies' offices but by men outside who have been made familiar with hazards through inspections, who personally know the risks to be classified and before whom to a considerable extent the daily reports of policies first come for verification of rate.¹ A careful count made less than four years since by a group of companies showed that more than eighty percent of all the daily reports of policies written in the United States (outside of New York City) passed through the hands of stamp clerks, and it would

¹ In a book of "Classification of Hazards" issued by the National Board in 1894, it is stated: "To what class a particular hazard should be assigned is a question which should be decided only by an expert."

require no extraordinary or impossible revision of duties to relegate the question of the classification of risks to the employee of the stamping offices or tariff associations in every part of the United States, under the general direction of the Actuarial Bureau and thereby secure complete uniformity in methods and application. Then the class formula of number and grading would be entered upon the daily report of each policy before being forwarded to the company, or at the same time that it received the certifying stamp of the stamp clerk as to the rate at which the risk was written. The best arrangement of these duties would be to combine the surveying, grading and classifying of risks in one person for a given district, and much time of the companies' examiners and clerks would thus be saved, while the accuracy of the classification statistics would be greatly enhanced.

If so carried out, the company, upon receiving its daily reports from the stamping offices, would find the class and grading formula already affixed, and it could then make such use or tabulation of its own classified experience as it thought best. There is little doubt that the employee of tariff associations, whose important duty it would be to apply grading schedules, would cultivate a quality of judgment concerning the hazards and character of risks that would give more effective and correct service in classification work than it is now possible to obtain.

It would also be no difficult task for the companies to make due provision for the classifying of risks not now passing through the hands of a stamp clerk, inasmuch as the percentage of daily reports not receiving such certification is small compared to the entire number.

To carry out this system of classification successfully and obtain the required loss-costs, a card of each writing (an example of which will be found on page 112, as well as of each loss, would be required; and this necessarily would mean from six to eight millions of cards for one year's business.¹

A mass of statistics of underwriting experience to be of value for obtaining loss or fire costs must be made up of writing and loss *units*, the individual identity of each unit being preserved by a record upon a separate card, which could, as necessary, be sorted by the tabulator into any combination of units that business interests might require.

A pack of playing cards is useful for the purpose intended only as long as each card is preserved in its separate and distinct state, but if a part of the pack becomes gummed together or lost it is needless to say the player would find the pack useless.

Any *bunched* experience mixed with the mass will make the whole impossible of proper separation and therefore useless for the purpose.

The Actuarial Bureau already deals with losses and loss-claimants in their original units, and by following that essential course is laying the foundation for a bureau of loss information, the value of which to the companies (and hardly less so to the public) is incomparably greater than any combined experience of the companies heretofore gathered.

The task of gathering and tabulating the cards for the year's business of the United States and computing the loss-cost thereon, seems like a formidable one, and a few years ago it would have been regarded as a work too great to be undertaken, but under present conditions it can be readily accomplished.¹

¹ An independent authority second to none in the tabulation by machinery of *combined* classified experience, has written in relation to the methods of the Experience Grading and Rating Schedule:

"When considering the relative merits of having the member companies of the Actuarial Bureau report their experience in summarized form, *or in the form of punched cards*, I am firmly of the opinion that the latter condition offers the most practical and by far the most economical one."

This method is now being pursued by over eighty-five insurance companies. A card for each writing, cancellation, reinsurance and loss is punched in the company's office and then forwarded to a well-known statistical bureau which from these cards tabulates and completes the classification of the entire business of each company.

This bureau is now handling for those companies and for reinsurance organizations, nearly six million cards annually, for which less than one hundred employees are required.

For the statistician the form of card for Writings to be used in the sorting and tabulating of experience would (experimentally) be prepared in the following manner—a card being given to each risk:

Policy No.		State	Com- pany	Amount Written			Term in Mo's		12 Expira. 11 Mo. Yr.	Occu- pancy Class	Grades			
City or Town	City or Town			Quality	Int.	Ext.	Constr'n							
		0 0	0 0 0					0 0 0	0 0	0 0 0	0 0 0	0	0	0
Street Location	1 1	1 1 1	1	1 1 1	1 1 1	1 1	1	1 1	1 1 1	1	E	1	1	F
	2 2	2 2 2	2	2 2 2	2 2 2	2 2	2	2 2	2 2 2	2	G	2	2	B
	3 3	3 3 3	3	3 3 3	3 3 3	3 3	3	3 3	3 3 3	3	A	3	3	X
Assured	4 4	4 4 4	4	4 4 4	4 4 4	4 4	4	4 4	4 4 4	4	I	4	4	
	5 5	5 5 5	5	5 5 5	5 5 5	5 5	5	5 5	5 5 5	5	P	5	5	
	6 6	6 6 6	6	6 6 6	6 6 6	6 6	6	6 6	6 6 6	6				
Property	7 7	7 7 7	7	7 7 7	7 7 7	7 7	7	7 7	7 7 7	7				
	8 8	8 8 8	8	8 8 8	8 8 8	8 8	8	8 8	8 8 8	8				
	9 9	9 9 9	9	9 9 9	9 9 9	9 9	9	9 9	9 9 9	9				

In construction column: F = Frame; B = Brick; X = Fireproof.

In the plan here proposed for a classification of the risks of the insurance companies contributing to the Actuarial Bureau, whereby the classification formula is to be recorded upon the daily report by the inspection or stamping bureau, a first step in the tabulation of the combined experience of the companies might be taken as follows:

While the daily reports were in the hands of that bureau, cards of each writing could be prepared in duplicate—one to be forwarded to the Actuarial Bureau and the other retained for filing and grouping, thus relieving the latter named Bureau and the companies of much preliminary work. The final work of tabulation and computing loss-costs would be handled by the Actuarial Bureau.

The most desirable and probably the most practicable method for tabulating the experience thus prepared for the Actuarial Bureau would be to deal with writings and losses by town grades (public protection) irrespective of state location, that is, such towns and cities of the same grade the business of which had been classified and graded, to be handled by the tabulator in mass.

Thus experience when assorted as provided for in Charts One and Two (pages 114-115) would be all of one grade of public protection—the other nine grades being similarly worked out each by itself.

By this method no specific designation of public protection would be required in the classification formula of the individual risk.

This rate-making system could be introduced simultaneously into all the states to such extent as each state was represented by towns of like grade in manner suggested.

The processes of tabulation are illustrated in Charts One and Two that follow:

These charts begin with United States experience in mass, which would first be grouped according to public protection between the ten grades of towns or cities as shown in Chart One, page 114; then writings and losses in each of the ten groups would be subdivided into their respective

Chart One
SUBDIVISIONS OF EXPERIENCE INTO CLASSES
BY CONSTRUCTION

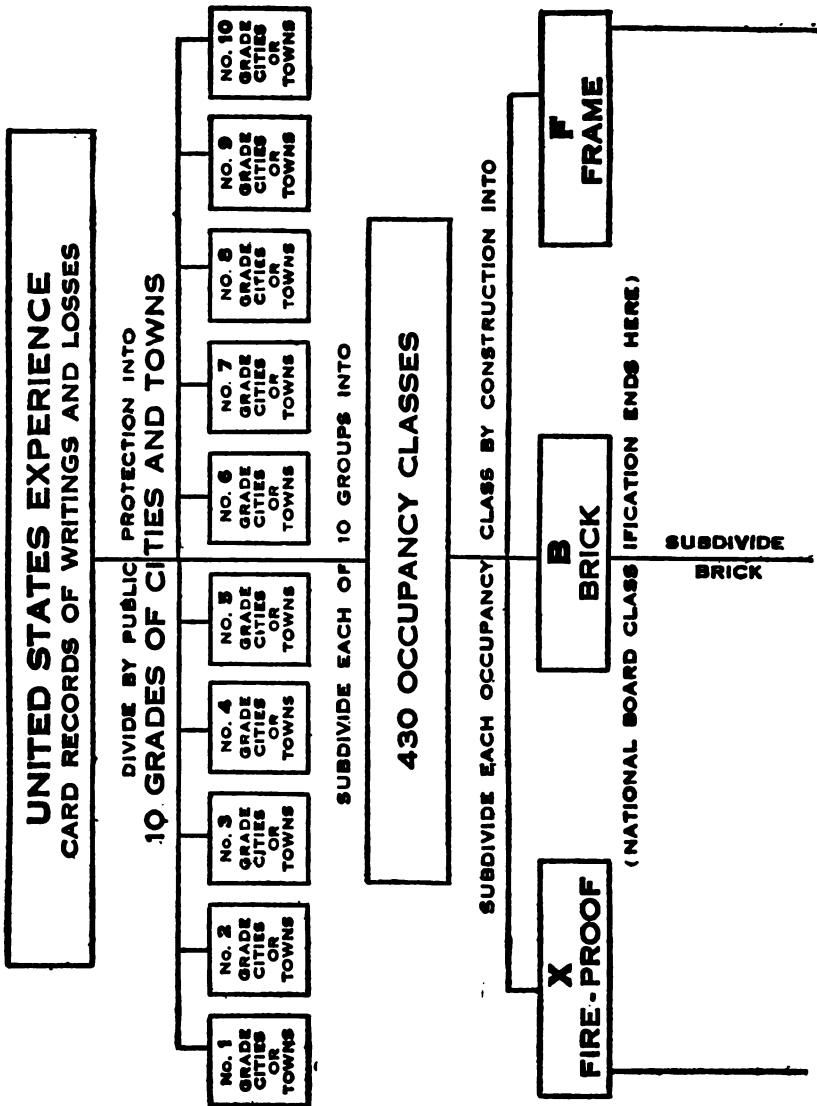
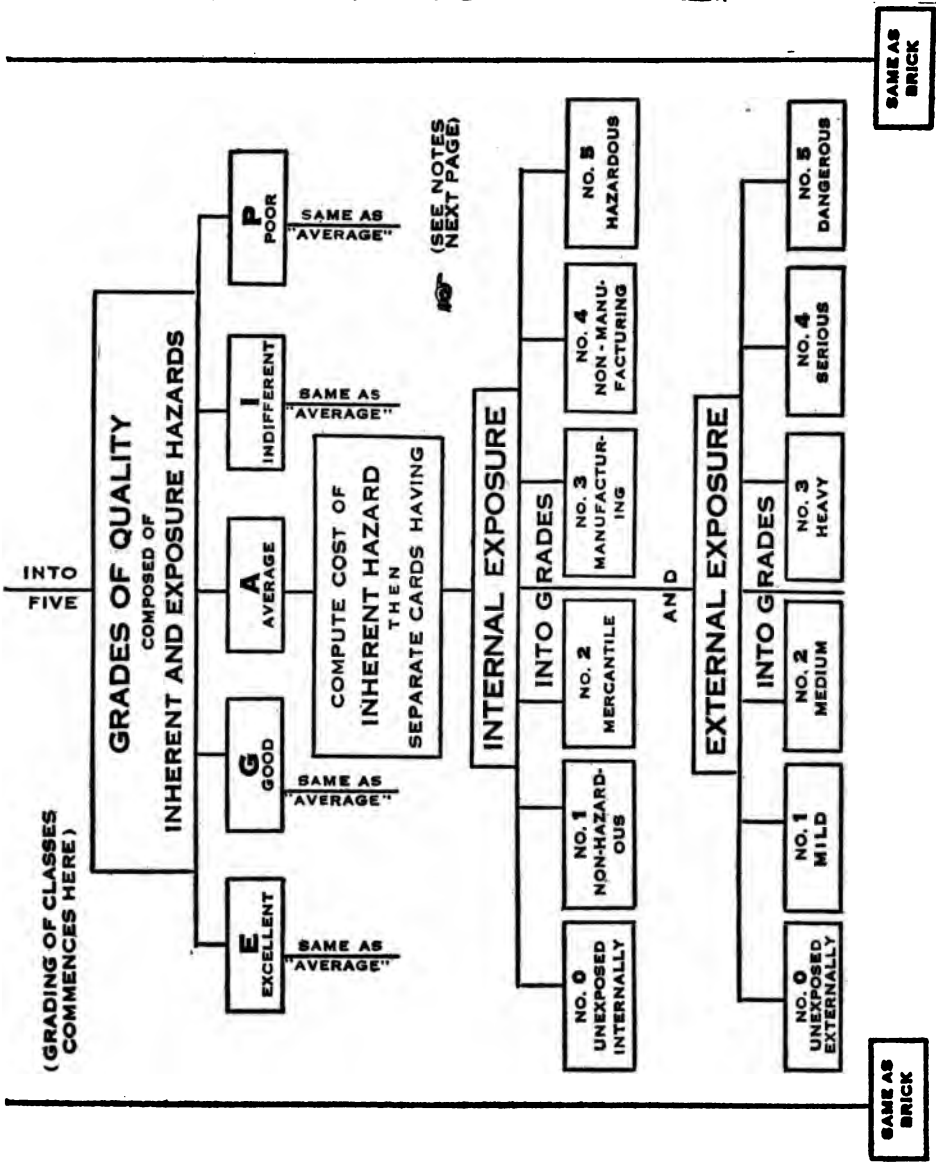


Chart Two

EXPERIENCE GRADING AND RATING SCHEDULE'S
SUBDIVISION OF CLASS-CONSTRUCTION INTO GRADES



occupancy classes. For instance, the first subdivision of experience in No. 1 cities and towns would be (as with the other nine) into:

430 Occupancy Classes. Each occupancy if specifically classified bears its own class number—odd numbers representing building and even numbers the contents, but wherever an occupancy bears an odd or contents number only, that fact indicates that building and contents are combined in the one class. The class numbers will be found in the list of Occupancy Hazards (Appendix). Each class would then be subdivided into

Construction, that is, subdivided according to the character of its building whether it be fireproof, brick or frame, and each is represented by the symbol, "X" for fireproof, "B" for brick and "F" for frame.

Classified experience under present rules ends with these subdivisions, which unfortunately have no value for loss-cost purposes. To obtain loss-costs of value it is necessary to subdivide each of these three divisions of construction into

Quality Grades. (See Chart Two, page 115.) The symbol for each of the five Quality grades is the first letter of the grade name, being "E" for Excellent, "G" for Good, "A" for Average, "I" for Indifferent and "P" for Poor. As each one of these five grades of quality, if Contents, is composed of three kinds of risks, Inherent Hazard, Internal and External Exposure, but if Buildings, of Internal and External Exposure risks only, further segregation is necessary to resolve each grade of quality into those final units—eleven in number if Contents, and ten in number if Buildings.

Inherent Hazard. Every occupancy (Contents) risk is subject to loss from its own inherent hazard, therefore the entire sum of writings in each grade of quality of a "Contents" class should be placed against the losses from inherent causes assigned to that grade, to obtain a correct ratio of fire cost. This is the first of the eleven units referred to.

When experience on Buildings only is subdivided (Buildings are designated as to class by *odd* numbers) it will be found to consist of Internal and (or) External Exposure only, for a Building has no Inherent Hazard of its own but receives its fire hazard wholly from Internal and External Exposure. (For tabulation purposes a Building as well as Contents must receive a "Quality" grading.)

Among the writings in each grade of Quality, Buildings or Contents, are also to be found those which are graded for:

Internal Exposure, and all so graded should be separated and subdivided into five grades, against the sum of each of which should be placed losses in that particular grade which were caused by internal exposure, from which the loss-costs of each of the five grades of that hazard will be obtained. With six of the eleven units thus separated and the loss-costs of each obtained, there would still remain in the mass five grades of external exposure to be dealt with.

External Exposure. All writings which bear gradings of this hazard should be segregated from other risks in each grade of quality, then divided into five grades and against the writings of each grade should be placed the losses caused by external exposure in that grade. In this manner the loss-cost of this hazard in each of its five grades can be ascertained.

Each grade of quality having been subdivided into the units of inherent hazard and exposure as shown, and the loss-cost of each unit (eleven in all) having been ascertained, those fire costs will constitute the foundation items for use in the making of every rate. (See pages 122 and 123.)

When risks are graded for exposure, if any, the several exposure grades, whether internal or external, are designated by numbers 1 to 5. Where no exposure exists it is so indicated by a cipher. For obtaining loss-costs every risk in a quality grade which has an *internal* exposure grading must be used in the computation of loss-costs, whether

a loss has occurred thereunder or not, because it has been *exposed* to loss. The same is true in computing *external* exposure loss-costs. Furthermore, the same risks will be used in both computations when graded for both internal and external exposure. (See Chart Two, page 115.)

The symbols to be used for designating class and grades of Writings and Losses are readily understood.

As an example of a formula for classifying and grading, a brick building located in a No. 1 city occupied by retail drugs with no other tenant in the building, the stock having been graded as excellent (E), internal exposure none (0), and assuming that the risk is externally exposed quite seriously, it is probable that its external exposure would be graded 4; the formula, therefore, on this risk would read 124 B-E, 0-4, and in the order of these characters it would represent retail drugs in a brick building, grade excellent, with no internal exposure but having serious external exposure.

The foregoing explanations aided by the charts themselves will demonstrate the methods of tabulation of experience herein proposed, and clearly visualize the methods required by this system for analyzing the component hazards of occupancy.

Chart Two shows what may be accomplished by further subdivisions of combined classified experience, for, with the subdivisions therein provided, there will be brought to light the differences between the good and the poor, the loss-cost of inherent hazard of the single tenant risk when separated from others having exposure hazards, as well as the cost of internal and external exposure.

It is a surprising fact that the *fire underwriter is at present entirely ignorant of these fundamental costs*, although they represent the elemental fire hazards.

When each of the grades of quality has been subdivided as set forth in Chart Two—and thus the average loss or fire cost of the ultimate units of fire hazard mathematically

determined—those loss-costs will be ready for use by the rate-maker.

This will mean that the average fire cost per \$100 of risk of Inherent Hazard, of Internal Exposure in each of its five grades, and of External Exposure also in each of its five grades (eleven in all) as found in each of the five grades of Quality, in Fireproof, Brick, and Frame risks, and in each of the 430 Occupancy Classes, will be ready for promulgation to the various rating organizations in the United States for each of its towns or cities according to its classification by public protection. While theoretically these several subdivisions would divide each occupancy class in each of the ten groups into 165 parts, the actual number of those subdivisions would not, in practical operation, be over one-half of that number and perhaps less.

In promulgating these basic costs to the rate-making organizations, it is presumed they would be sent out in book form—three or four books for the ten groups of classified cities and towns, and that each book would contain also the key-rate for the United States, the key-rate of each state and the rating schedule by which every specific rate would be computed.

Sample pages here follow to illustrate more clearly the plan of operation.

The publication of this information would be free from all possible objection to company, agent or client, for application of those fire costs to a specific risk would be impossible until the classification and grading formula of that risk was known.

Completed tariffs of towns or cities would be published to underwriters in same manner as at present.

KEY RATES (SAMPLE PAGE)

The following key-rates are based upon the combined United States experience of the Fire Insurance Companies for the years 1903-1912 inclusive:

Key-rate of the United States..... 1.125

Key-rate of each state

Maine	1.538	Michigan	1.197
New Hampshire.....	1.169	Wisconsin	1.258
Vermont	1.301	Minnesota	1.436
Massachusetts	1.035	Kentucky	1.410
Rhode Island.....	.853	Tennessee	1.624
Connecticut.....	.841	Illinois	1.259
New York.....	.751	North Dakota.....	2.019
New Jersey.....	.864	South Dakota.....	1.471
Pennsylvania	1.010	Iowa	1.430
Delaware	.730	Nebraska	1.223
Maryland	1.000	Missouri	1.123
District of Columbia.....	.535	Kansas	1.359
West Virginia.....	1.544	Arkansas	1.822
Virginia	1.405	Washington	1.717
North Carolina.....	1.281	Oregon	1.666
South Carolina.....	1.370	Idaho	2.251
Georgia.....	1.355	Montana	1.937
Florida	2.174	Wyoming	1.532
Alabama	1.888	California	1.463
Mississippi	1.974	Nevada	2.106
Louisiana	1.447	Utah	1.103
Texas	1.601	Colorado	1.366
Oklahoma	1.392	Arizona	2.168
Ohio	1.063	New Mexico.....	1.740
Indiana	1.079		

Average of all states..... 1.125

When policy is written without coinsurance of at least 80%, add to the state key-rate 20%. See pages 80 and 81.

RATING SCHEDULE (SAMPLE PAGE)

For computing the premium rate (cost plus 5%) for \$100 of insurance for a one-year term from actual experience upon Building or Contents in No..... Grade City or Town in the United States:

Risk Jones Brothers' Retail Drug Store
Location Main Street, Detroit, New York.

Public Protection—No. 4 Grade (or class) City.

Classified and Graded 124 B-A, 0-3, as follows:

Occupancy Class.....	No. 124	<i>Loss-Costs from Actuarial Tables</i>
Contained in Brick Building.....	B	
Inherent Hazard ¹ ..Quality Grade (E-G-A-I-P) Average....		.275
Internal Exposure .	" (0-1-2-3-4-5) None	.00
External Exposure.	" (0-1-2-3-4-5) Heavy	.4125
Total Average Fire-Cost (55% of final rate).....		.6875
Add for Expense (40% of final rate).....		.50
" " Profit (5% " " ").....		.0625

Final rate for a risk of its class and gradings in the United States..... 1.25
The risk above described being located in New York State, the key-rate of which is .751
while the key-rate for the United States is 1.125

The rate for this risk would be	$\frac{.751}{1.125}$	of 1.25.....	.834
If in Illinois the rate would be	$\frac{1.259}{1.125}$	of 1.25.....	1.40
" " Ohio " " " "	$\frac{1.063}{1.125}$	of 1.25.....	1.18
" " Georgia " " " "	$\frac{1.355}{1.125}$	of 1.25.....	1.50
" " California " " " "	$\frac{1.463}{1.125}$	of 1.25.....	1.63
" " Utah " " " "	$\frac{1.103}{1.125}$	of 1.25.....	1.23
" " Washington " " " "	$\frac{1.717}{1.125}$	of 1.25.....	1.91

NOTES.—It must be borne in mind that these key-rates are now eight years old. When the experience of ten years 1911-1920 are available the key-rates will be found to be *very much lower*.

Wide as the rates on risk above rated range in the states quoted, their range is not materially different than the actual state averages as shown on page 47, column 9.

¹If a Building is being rated, no charge is made for Inherent Hazard, for a Building has none. Its fire loss-costs arise only from Internal Exposure from its occupant or occupancies, plus External Exposure, if any.

SAMPLE PAGE
AVERAGE FIRE-COSTS (HYPOTHETICAL)
OF ELEMENTAL HAZARDS IN FOURTH GRADE CITIES
IN THE UNITED STATES
BY CLASSES AND GRADES

	INHERENT HAZARD	INTERNAL EXPOSURE GRADES					EXTERNAL EXPOSURE GRADES						
		0	1	2	3	4	5	0	1	2	3	4	5
Class 123—Building													
Fireproof	A Building has no Inherent Hazard												
Grade Excellent (E).....		.03	.035	.06	.10	.06	.12	0	.01	.01	.02	.04	.07
" Good (G).....		.04	.04	.07	.14	.08	.16	0	.02	.03	.05	.08	.11
" Average (A).....		.045	.045	.09	.18	.10	.20	0	.03	.06	.09	.12	.15
" Indifferent (I).....		.05	.05	.11	.22	.12	.25	0	.04	.08	.12	.16	.20
" Poor (P).....		.05	.06	.14	.25	.15	.30	0	.05	.10	.15	.20	.25
Brick													
Grade Excellent (E).....		.15	.02	.18	.42	.53	.64	0	.05	.10	.15	.20	.25
" Good (G).....		.16	.03	.19	.49	.57	.75	0	.08	.16	.24	.32	.40
" Average (A).....		.17	.04	.20	.55	.70	.86	0	.12	.26	.41	.50	.60
" Indifferent (I).....		.19	.05	.22	.61	.75	.97	0	.16	.32	.48	.64	.80
" Poor (P).....		.23	.06	.24	.70	.89	1.00	0	.20	.45	.70	.80	1.00
Frame													
Grade Excellent (E).....		.25	.06	.40	.90	.65	1.00	0	.15	.35	.55	.80	1.00
" Good (G).....		.27	.07	.44	.95	.70	1.05	0	.15	.40	.60	.85	1.05
" Average (A).....		.29	.08	.48	1.00	.75	1.10	0	.20	.40	.65	.90	1.10
" Indifferent (I).....		.30	.10	.52	1.10	.80	1.15	0	.25	.45	.65	.90	1.10
" Poor (P).....		.32	.12	.55	1.20	.90	1.20	0	.25	.45	.70	.95	1.15

Universality—Simplicity. Thus far this work has been devoted largely to a discussion of the principles and the methods of *preparation* of underwriting experience.

Now as to *rate-making*, when experience costs have been ascertained in all required details, their application by the rate-maker to the individual risk would be simple and easily understood. Doubtless experience costs would be published as described on page 119 and as illustrated on pages 122-123, which costs would be furnished to each rate-making organization. Every such organization would have in its files the classification and grading formula of each risk in its jurisdiction, as it now has the surveys and rating schedules. With a knowledge of that formula and having the experience costs before him the fixing of the rate by the rate-maker would be as follows:

Assuming that the risk to be rated is Contents of a department store, a sole tenant risk in a brick building, with mild exposures in a No. 3 city, presuming its classification and grading formula would be 188 B-A, 0-2—meaning thereby the contents of a department store in a brick building of an “average” grade of quality, no internal exposure but external exposure grade 2—the rate-maker would obtain from his book of “Average Fire Costs” the cost of inherent hazard of a department store in a brick building in a No. 3 city with an “A” quality grading. Having no internal exposure but external exposure grade 2, he would find upon the same page of the experience-cost book the cost of that grade of exposure to a department store of that description.

Assuming that the inherent hazard cost was 40 cents and the cost of external exposure 25 cents, the fire costs for making up the rate would amount to 65 cents, which sum would represent 55% of the whole rate; the other 45% being made up of 40% expense and 5% profit. Thus the rate on a risk of this description in the United States would be: 1.18.

This rate would then be graded upward or downward in the proportion that the key-rate of the state in which the risk was located bore to the key-rate of the United States and if in a number three grade city in the State of New York the rate would be 78.7 cents per \$100. (See Rating Schedule, page 121.)

The process would be the same in every other case, varying only as to the elements of fire cost entering into the risk—whether all three were a part of the cost or one or two as the case might be.

These varying conditions are set forth on page 86 in "An Analysis of Hypothetical Rates."

If the risk were a woolen mill and unexposed, the single loss-cost would be that of inherent hazard, which would constitute 55% of the rate for the United States, the balance as before being made up of 40% expense and 5% profit. This rate would then be graded upward or downward as the key-rate of the state in which it was located required.

The same would be true if the risk were a dwelling. In this way experience costs would be used for obtaining specific rates and every rate so made, wherever in the United States, would carry its 40% expense and 5% profit and be similarly adjusted by the state key-rate applying.

These illustrations will demonstrate the simplicity of this system of rate-making, its correctness based upon past experience and its universal fairness of application.

CONCLUSIONS

The great competitor of the stock company is the mutual system. Mutual competition in fire insurance is not new, but has always existed in one form or another. Many companies are operating upon the mutual system, the methods of which are quite as sound and successful as those of well-established stock companies. The best and the poorest may be found in either cult. For meeting the competition of the financially strong and well-established mutual companies the most effective arguments of the stock company should be that (1) it furnishes to its customers indemnity and service equal to the best, (2) at a proven cost plus only a profit of 5% and (3) freedom from liability of assessment which adheres to the mutual system. With rates upon such a basis the stock and mutual companies would be in that respect upon the same level, for such fixed margin of profit would be so small that rebates of whatever kind would be impracticable.

The belief in the community that the stock fire insurance companies are making excessive profits (which is true only in certain classes of so-called preferred business) is the potent argument used by the mutual competitor although he, too, specializes upon those classes; but if the fact is once confirmed in the mind of the public that the rates of insurance upon every class of business in every locality are produced from actual cost experience, to which not exceeding 5% profit is added, that argument will disappear.

But it is not enough to prove to the insurant that the stock insurance companies are making not exceeding 5% profit on their business *as a whole*. They must also be prepared to prove that this particular class is not being

persistently penalized by excessive fire premium rates to make good the losses of other classes that are *persistently* undercharged; for it has not seldom but often occurred that the stock fire insurance companies have been accused (though unjustly) with intentionally favoring large vested interests in the matter of their rates to the disadvantage of the small property-owner. Preferred business, by which name those classes are known that are uniformly great profit-producers, is wrong in principle and in practice; "to rob Peter and pay Paul" is not justifiable. But with positive proof to the public that not exceeding 5% profit is being charged as a whole or upon the individual risk and that all classes are being dealt with alike, criticism of unjust discrimination or unreasonable profit will cease.

Quite naturally the question has occurred to some who have given consideration to this plan of rate-making, if it were adopted, what disposition would be made of classes which in number of risks have an insufficient volume of writings and losses to secure an average.

It would seem that such classes should be allowed a sufficient number of years to accumulate average results and in the meantime the few risks of the kind could be rated in the same manner as in the past—that is, by judgment rating or schedule—awaiting the accumulation of average experience, or they might be combined with some other class or classes of not unlike hazard.

Surely the comparatively few risks of this kind would represent less than 5 per cent of all, and these should not prevent the workings of a rate-making system which would be well adapted to the other 95 per cent of the business of the United States.

The desirability of a business risk is measured to a considerable degree by the financial standing and record of the party insured, though no attempt has ever been made as yet to inject directly and specifically that feature into the

rate charged. For the first time this element of selection is given recognition under this system of rate-making, and as the financial standing of a party is graded by his capital, credit and business character, so by this system is his insurance status measured by his combined physical and financial record as well as his fire record, if any. That there is a choice in favor of the party to be insured (whether his financial resources be large or small) who has a high commercial credit and a record of freedom from fire loss, there can be no doubt.

Under the operations of the "Experience Grading and Rating Schedule," each rate produced from classified experience of the United States when applied in a given state is increased or diminished in the same proportion that the average state rate is higher or lower than the average rate of the United States. The adjustment of rates according to state experience now prevails under present rating systems, but it is brought about in a crude way through the operation of the law of supply and demand and not in a mathematically correct way as would be done under this rate-making system, which was devised as a means of adjusting rates in each state upon a basis of cost plus 5%.

It has been said that this method would work out unfairly, that the average rate of a state may be affected by a preponderance of low-cost or of high-cost business and a comparison has been made between Oregon and Rhode Island.

The business of any one state is too great in volume to be thus affected in any material way.

In Oregon, over a period of thirty years, the average premium rate has decreased from 2.13 to 1.49 while in Rhode Island the decrease in average rate has been from 1.04 to .92 and there is little doubt that in the course of years the average rate in Oregon, and of other high-cost states, will drop to as low a figure as that of Rhode Island, but if so it

will be because of a decrease in the ratio of fire cost and of expense costs as well.

It is said that "companies generally are desirous of obtaining experience, taking into consideration reinsurances as well," and for many reasons it would seem that the experience of the companies should be reported *net* and not gross; in other words, that writings and losses should be freed from both cancellations and reinsurances. Reinsurance is essentially a cancellation to the reinsured even as the ordinary cancellation is to the assured. The effect is the same in either case.

This is contrary to the plan of the Actuarial Bureau, but the custom prevailing in most fire insurance offices in dealing with their own classified experience is in line with this conclusion, and surely net figures are susceptible of exact proof while it is very doubtful if gross figures ever are or can be verified. Therefore, what is customary in the individual office can be more readily carried out in the reporting of experience to the Actuarial Bureau and the aggregates will be far more satisfactory because correct.

One practical result to be gained from the operation of this system would be a check upon if not an actual reduction in the volume of long-term insurance, for it would make the writing of insurance for a longer term than one year impracticable at less than full experience rates. Business could not then be insured at two or two and one-half rates for three years, neither could five-year policies be written at less than five annual rates without positive loss.

It is not unreasonable to assume that if insurance rates were formulated from actual underwriting experience upon an accepted national system there would be no logical rea-

son for the existence of rate-making boards conducted by a state, when the fact had been substantiated that the system of rate-making so adopted furnished a permanent, scientific and correct method of arriving at the true cost of insurance, with a definite limit placed upon the ratio of profit to be made by the insurance company.

APPENDIX

Extract from the Annual Address of the President (Mr. Kremer) of the National Board of Fire Underwriters, May 28, 1914.

An impressive idea of progress in the solution of rating problems is the possibility of a plan that is receiving the attention of our Executive and Actuarial committees. The latter committee was appointed in December last to give special consideration to the recommendations of Vice-President Richards in an important letter addressed by him December 11th to the Executive Committee, upon the subjects of Classification of Writings and Losses, the establishment of a Loss Bureau and the possibility of devising some form of Standard Rating Schedule based upon actuarial experience and for national use. It involves a combined classification with an experience-grading and rating schedule based thereon. It especially recommends itself for most thoughtful consideration, for while it is known to the fraternity, and is becoming more generally understood by the public, that statistical experience is of little value as a guide in making rates under present rating methods, the plan under consideration gives fair promise of offering some solution of the problem of rate-making from actual and combined experience of the National Board companies. If that may be accomplished, then its useful function would be a compensating feature to offset the time, trouble and expense that would be involved, and more wholesome conditions effected as a result. A vast amount of thought and work has been given to the subject, and it is proposed to call a special meeting of the National Board of Fire Underwriters for its consideration, as soon as a definitely favorable agreement relative thereto is reached by the Executive Com-

mittee, for it is a matter on which the entire Board membership should act with respect to its adoption.

The same Special Committee has given attention to the desirability of establishing a Loss Bureau in the National Board, and its conclusions and recommendations upon both topics, which have been concurred in by the Executive Committee, will be presented to you through a special report at this meeting by the Actuarial Committee.

Extract from the Annual Address of the President (Mr. Kremer) of the National Board of Fire Underwriters, May 27, 1915.

There is, however, a new Standing Committee added to the number—the Actuarial Bureau—and its purposes are of such importance that it seems worthy of special comment. By vote of the Board last year, following the report of a then Special Committee, the establishment of a Loss Bureau was approved, and the Committee continued its labors and produced a “Classification List of Occupancy Hazards and Loss Report Form,” which received the unanimous endorsement with assurances of support of the National Convention of Insurance Commissioners and the State Fire Marshals’ Association.

The entire subject was considered at a special meeting of the Board in October last and approved.

The Special Committee was made a Standing Committee, and the Actuarial Bureau began operations on January 1, 1915. The time and energy devoted to the work by the Committee, and especially by Chairman Richards, is worthy of special mention.

Fire insurance is a business of averages, and if the experience of an individual company is worth while in the exercise of its underwriting practices, how much more valuable will the combined experience uniformly kept and properly collated be to all, for the law of averages will prevail. The underwriting of a single risk embraces a serious element

of chance, but sound judgment enters into the writing of many risks based on the average loss of thousands of risks of like hazard and character. The support accorded this undertaking has been most encouraging. All members of the Board, with a very few exceptions, are reporting their losses to the Bureau, and in addition forty other stock companies, and thirty-one mutual companies, are affiliated with the work. Each company should adopt this system of classifying its business, and by reporting its writings and losses do its share to assist in determining the actual loss-cost or the ratio of loss to the amount written of every hazard. Such data as a few years of experience would furnish may change our viewpoint and verify or disprove some of the accepted theories upon which underwriting has been predicated in the past.

The membership of the Bureau embraces all classes of fire insurance companies, and the field of its activities, like all other work of the Board, is nation wide. The Insurance Commissioners' Committee and the State Fire Marshals' Association have pledged their support unanimously, and in some states legislation has been enacted or rulings issued that all companies must file their reports with the Bureau. It is a public work for the general good, respecting which the New York Insurance Department commented as follows: "The most important and significant event of the year in the fire insurance field was the inauguration by the National Board of Fire Underwriters of a practical and comprehensive plan for the gathering of the combined loss experience of the fire insurance companies transacting business in the United States. . . . The adoption of this plan promises to lessen and eventually remove the friction and dissatisfaction which has sprung up between insurers and the insured with relation to the rates charged for fire insurance, and may well be expected to develop scientific information concerning the causes of fires and their prevention, which results will be highly beneficial."

The success of this movement will be measured by the

co-operation given it on the part of the companies, the commissioners of insurance and the state fire marshals; but, if such supervising officials are going to advocate legislation in this direction and exploit their individual viewpoint, the plan evolved and sanctioned by the many will be changed to a system so void of uniformity as to be not only burdensome but utterly valueless and absurd.

CLASSIFICATION
OF
OCCUPANCY HAZARDS

ADOPTED BY THE
NATIONAL BOARD OF FIRE UNDERWRITERS
OCTOBER 29, 1914

(An abbreviated form of classification was substituted January 1, 1918)
but not here used

CLASSES BY GROUPS

NON-HAZARDOUS
1-100
MERCANTILE
101-298
MANUFACTURING SPECIALS
300-600
NON-MANUFACTURING SPECIALS
602-700
MISCELLANEOUS
701-
AUTOMATIC-SPRINKLERED RISKS
801-

NON-HAZARDOUS

BLDG. CONTENTS

- | | | |
|----|----|---|
| 1 | 2 | Barns and Stables—private (other than Farms) |
| 3 | 4 | Churches and Chapels |
| 5 | 6 | City and Town Halls—Court Houses, State Capitols, Armories,
Fire Department Houses |
| 7 | 8 | Colleges—Universities, Boarding Schools—Convents |
| 9 | 10 | Dwellings—without Barns, or with Barns Attached (excluding
Classes 11–16, inclusive), Apartment and Flat Houses (Apartment
Houses having one general Dining-Room, classify with
Hotels, see 643–644) |
| 11 | 12 | Dwellings—palatial—or \$50,000 value or more |
| 13 | 14 | Dwellings and Barns—Summer or Winter only |
| 15 | 16 | Dwellings—occupied for Farming purposes |
| 17 | 18 | Farm Barns and other Outbuildings occupied for Farming pur-
poses (except live stock, see Class 20) |
| | 20 | Live Stock on Farms, in or out of Buildings (all other personal
property on farms except contents of dwellings and 703 and
704 to be classified under 18) |
| 21 | 22 | Garages—private |
| 23 | 24 | Hospitals |
| 25 | 26 | Libraries—public—Museums of Art or Natural History |
| 27 | 28 | Schools and Academies without Dormitories |

MERCANTILE

- | | | |
|-----|-----|--|
| 101 | 102 | Agricultural Implements |
| 103 | 104 | Artists' Materials and Art Stocks—Pictures and Picture Gal-
leries |
| 105 | 106 | Automobile and Carriage Salesrooms |
| 107 | 108 | Books—Stationery—School Supplies |
| 109 | 110 | Boots and Shoes—retail |
| 111 | 112 | Boots and Shoes—wholesale |
| 113 | 114 | Clothing, Hats, Caps, Furs and Men's Furnishings—retail—
Merchant Tailor—Regalia—Costumer—Dressmaking |
| 115 | 116 | Clothing, Hats, Caps, Furs and Men's Furnishings—wholesale |
| 117 | 118 | Confectionery—Ice Cream Parlors |
| 119 | 120 | Crockery, China and Glassware |
| 121 | 122 | Doors, Sash, Blinds—Builders' Materials |
| 123 | 124 | Drugs, Chemicals—Medicines—retail |
| 125 | 126 | Drugs, Chemicals—Medicines—wholesale |
| 127 | 128 | Dry Goods—Woolens—Carpets and Notions—Chinese and
Japanese Goods—retail |
| 129 | 130 | Dry Goods, etc. (same as 127–128)—wholesale |
| 131 | 132 | Furniture Stores—Undertakers' Establishments |
| 133 | 134 | Gas and Electric Fixtures—Lamps and Chandeliers |
| 135 | 136 | Groceries, retail—Meat—Fish—Butter—Cheese—Eggs—Fruit
and Produce |
| 137 | 138 | Groceries, etc., wholesale |
| 139 | 140 | Hardware—Iron and Steel Bars and Piping—Cutlery—Surgical
Instruments—retail |
| 141 | 142 | Hardware, etc. (same as 139–140)—wholesale |

BLDG.	CONTENTS
143	144 Hay—Grain—Feed—Flour—Seeds
	146 Household Furniture in Mercantile Buildings
147	148 Jewelry—Clocks—Watches—Silverware and Bric-à-Brac
149	150 Leather Goods (other than boots and shoes)—Harness—Trunks—retail
151	152 Leather—Hides—Harness and Trunks—wholesale
153	154 Liquors—Wines—wholesale
155	156 Lodge and Society Rooms (Masonic, Odd Fellows, etc.)
157	158 Machinery—Belting—Mill Equipment Supplies
159	160 Mercantile <i>Miscellaneous</i> (excluding such as are assignable to a specific class because of a single or predominant occupancy). (For Offices and Banks see 167–168)
161	162 Millinery—Feathers—Artificial Flowers—retail
163	164 Millinery, etc.—(same as 161–162)—wholesale
165	166 Musical Instruments—Music—Photographers' Supplies—Optical and Scientific Goods
167	168 Offices and Banks (sole or predominant occupancy)
169	170 Paints—Oils—Glass—Paper Hangings
171	172 Paper (excluding Stationery). This class includes new stocks of finished paper and has no reference to junk or old paper stocks
173	174 Pawnbrokers' Stocks
175	176 Restaurants
177	178 Rubber Goods
179	180 Saloons (Liquor)
181	182 Ship Chandlery
	184 Stores—Country (Remote or Cross Road), usually of moderate or small values
185	186 Stores—General (Village or City), usually carrying larger values than in Country Stores, with mixed stocks, but less complete or varied than in Department Stores
187	188 Stores—Department. Usually includes all classes of retail goods required for the person or the household—notably Furniture, Crockery, and sometimes Exhibition and Entertainment Halls and Restaurants
189	190 Stoves—Tinware—House Furnishings—Wooden, Willow and Basketware
191	192 Telephone Exchanges
193	194 Tobacco—Cigars—Smokers' Articles—retail
195	196 Tobacco, etc. (same as 193–194)—wholesale
197	Wharf Risks—Ferry Houses
251	252 Warehouses—Acid and Chemical
253	254 “ Cold Storage
255	256 “ Cotton (no compressing)
257	258 “ Grain in Sacks
259	260 “ General Storage (not specifically classed)
261	262 “ Glass
263	264 “ Hay, Straw—Broom Corn
265	266 “ Hemp—Jute—other Vegetable Fibers (not specifically classed)
267	268 “ Household Furniture
269	270 “ Naval Stores—in Storehouse or Yard
271	272 “ Oils
273	274 “ Rice
275	276 “ Tobacco
277	278 “ Whiskey
279	280 “ Wool

MANUFACTURING SPECIALS

WOOD-WORKERS

WOOD-WORKING WITH IRON-WORKING AND PAINTING

BLDG. CONTENTS

- 300 Agricultural Implement Factories and other Factories having wood-working (principally hard) in conjunction with iron-work, painting, etc., such as Carriage, Bed Spring, Incubator, Refrigerator, Sewing Machine and Wringer Factories and Car Works

WOOD-WORKING WITH FINISHING

- 302 Carpenter and Cabinet Shops without power—Looking Glass and Picture Frame Factories—Cooper Shops
 304 Chair, Pail, Tub, Tank, Bobbin, Ladder, Wooden Toy and other Woodenware Factories
 306 Furniture, Piano, Organ, Graphophone, Rattan, Wooden Trunk, Casket and Billiard Table Factories—Clock Factories—if with wood-working

MISCELLANEOUS

- 308 Marine Railways, Ship Yards, Boat Building, Dry Docks
 310 Match Factories
 312 Miscellaneous Wood-workers (not otherwise herein provided for specifically)

WOOD-WORKING IN ROUGH

- 314 Molding—Turning—Wheel—Hub—Spoke and Spool Factories—Carpenter Shops (power)
 316 Planing Mills—Sash, Door, Blind and Wooden Box Factories—Dry Houses for Lumber
 318 Saw Mills
 320 Shingle, Stave, Lath, Veneer and Kindling Wood Mills—Excelsior Factories

METAL-WORKERS

- 321 322 Automobile Factories
 323 324 Foundries for Iron, Brass, Type Work and Stoves—Furnaces—Rolling Mills
 325 326 Hardware Factories for manufacturing Cutlery, Copper or Brassware, Axes, Tools, Nails, Tacks, Pins and Needles—also Clock Factories if no wood-working
 327 328 Jewelry, Watch, Dental, Scientific and Surgical Instrument Factories
 329 330 Machine Shops (with Foundries connected)—Boiler Shops, Nut and Bolt Works, Bicycle and Firearms Factories, Locomotive Works, Wire-working and Drawing (for Foundries, see 324)
 331 332 Machine Shops without Foundries

BLDG. CONTENTS

- 333 334 Miscellaneous Metal-workers not otherwise specified
 335 336 Silver, Aluminum and Tableware Factories—Electro-plating
 338 Stamping Works—Tin, Hollowware, Iron Bedstead, Gas Fixtures, Lamp and Iron Toy Factories—Japanneries

OTHER OCCUPATIONS

- 339 340 Artificial Flower Factories—Feather working
 342 Asphalt, Tar, Roofing Material Works
 344 Bag-making, all kinds except Paper (for Bagging Factories, see 438)
 345 346 Bakeries—Macaroni Factories
 347 348 Blueing, Mucilage, Paste and Ink Works, excluding Printing Ink Works
 350 Bleacheries, Dye and Print Works
 351 352 Boot, Shoe, Slipper, Heel and Counter Factories
 354 Breweries
 356 Brush and Broom Factories
 358 Canning and Preserving Works for Fruit and Vegetables
 360 Canning Works for Fish
 362 Card Clothing
 364 Carpet Lining and Batting Factories
 366 Celluloid and Celluloid Goods Factories
 368 Cement Mills
 370 Cereal Mills—except Flour and Rice Mills
 372 Chemical Works. *Acids*, to include the manufacture of sulphuric acid, by either chamber or contact processes, nitric and hydrochloric acids
 374 Chemical Works. *Heavy Chemicals*, to include plants making only one or two articles of a more or less non-hazardous nature, such as sulphate of copper, bichromate of potash and soda, nitrate of iron, tannic acid, borax, sodium carbonate and other coarse chemicals, generally used in large quantities. Such risks seldom make more than one or two of these articles
 376 Chemical Works. *Chemicals of a known hazardous nature*, as chlorate of potash and soda, nitrate of potash, smokeless powder and other similar articles
 378 Chemical Works. *Electrolytic Plants* for reduction of metals, manufacture of sodium bi-chromate, chlorine, etc. (*Excluding* chlorate of potash, or other known hazardous articles where the finished goods constitute the predominating hazard, for which see 376)
 380 Chemical Works. *Volatile solvents*, including ether, acetone, etc.
 382 Chemical Works. *Miscellaneous*. Plants involving the handling and manufacture of numerous hazardous chemicals of a very diversified nature. The processes are oftentimes difficult to obtain information about and the hazard is always more or less of a doubtful quantity. This group includes the manufacture of aniline and other coal tar dyes
 383 384 Cleaning Establishments
 385 386 Clothing, Cap and Overall Factories (for Rubber Clothing, see 490)
 388 Coal Breakers and Mining Buildings—Anthracite
 390 Coal Tipples and Top Works—Bituminous
 392 Coffee, Spice and Mustard Mills

BLDG.	CONTENTS
393	394 Collar, Cuff, Shirt, Corset, Waist and other White Goods Factories
395	396 Confessionery, Chocolate and Chewing Gum Factories
	398 Cork Works (Vegetable)
	400 Corundum, Emery Wheel and Sand-paper Factories
	402 Cotton Gins
	404 Cotton Mills (Thread and Fabric)—Linen and Flax Mills and Cotton Hosiery, full process
	406 Creameries, Powdered and Condensed Milk, Casein and Cheese Factories
407	Crematories—Incinerating Plants
	410 Creosote and Wood Preserving Works
	412 Distilleries—Rectifying Works (Steam)
	414 Drug, Dyewood, Bark Extract and Licorice Mills
	416 Electric Light and Power Plants (when separately insured)
417	418 Fertilizer and Phosphate Factories
	420 Flour Mills
	422 Foundry Facing Works
	424 Fur Hat, Fur Cutting, Forming and Dressing Mills
	426 Glass Works
	428 Glucose and Starch Factories
429	430 Grain Elevators and Warehouses, Terminal (for Grain in Sack Warehouses, see 258)
431	432 Grain Elevators and Warehouses—Country (for Grain in Sack Warehouses, see 258)
	434 Graphite and Pencil Works
	436 Grist and Feed Mills
	438 Hemp and Jute Mills—Cordage and Bagging Factories (for Bag-making, see 344)
439	440 Horn, Ivory (Animal and Vegetable), Tortoise and Pearl Goods Factories
	442 Ice Factories
	444 Lamp and Bone Black, Blacking and Stove Polish Works
445	446 Laundries (hand or power)
	448 Lead Pipe and Sheet Lead Works
449	450 Leather Goods Factories (except Boot and Shoe) such as Harness, Saddlery, Pocket-book, Glove, Bag, Leather Trunk, Whip and Sporting Goods
451	452 Malt Houses
453	454 Mattress Factories, Feather Renovating and Pillow Factories
455	456 Medicine Factories, Perfumery and Extract Works, Pharma- ceutical Works (for Bark Extract, see 414)
	458 Mining risks (other than coal) including Mining Dredges
459	460 Miscellaneous (Manufacturing Establishments operated with Machinery, not otherwise classified)
	462 Oil Cloth, Oil Clothing, Shade Cloth, Linoleum and Corticene Factories
	464 Oil Works—Vegetable
	466 Oil—Vegetable in Tanks
	468 Oil Works (Fish)
	470 Oil Works (Mineral), Refineries, Oil Derricks, Pipe Lines
	472 Oil—Mineral in Tanks and Sumps
	474 Packing Houses, Slaughtering, Rendering, Oleomargarine, Lard, Candle, Crude Glycerine and Glue Works
	476 Paint, Varnish, White Lead and Oil Color Works, Turpentine Refineries and Printing Ink Works
477	478 Paper Box, Paper Bag and Envelope Factories
	480 Paper, Pulp, Leather Board and Straw Board Mills

BLDG. CONTENTS

	482	Peanut Factories
	484	Potteries, Brick, Tile, Plaster and Crucible Works, China Decorating
485	486	Printing Establishments, Lithographers, Bookbinderies
	488	Rice Mills
	490	Rubber Mills, including manufacture of Rubber Goods and Clothing
	492	Salt Works
	494	Silk Mills
	496	Soap Stone and Talc Factories
	498	Soap Factories (when insured separately from Packing House or other plants)
499	500	Straw Goods Factories, Mattings
	502	Sugar Houses
	504	Sugar (Cane and Beet) Refineries
505	506	Tanneries (Sole Leather)
507	508	Tanneries (Upper Leather), Currying Shops, Morocco Works and Leather-making generally, without Japanning
509	510	Tanneries (Upper Leather) with Japanning or Enameling
511	512	Tent, Awning, Sail and Rigging Lofts
513	514	Tobacco, Cigar, Cigarette and Snuff Factories
515	516	Tobacco Stemmeries, Prizeries and Rehandling Houses
	518	Wall Paper Factories
	520	Waste and Shoddy Mills
521	522	Weaving Mills (Weaving and Knitting only of Cotton, Wool or Elastic Goods), Embroidery and Lace Curtain Factories
	524	Whiting Factories, Gypsum, Kalsomine, Barytes and Plaster Mills—Lime Kilns
	526	Wineries
	528	Woolen Mills (full process. All-wool or mixed stocks), Worsted, Carpet, Knitting, Felting, Woolen Hat Factories
	530	Wool Pulling and Scouring
	532	Yeast Factories, Essential Oils, Vinegar and Cider Mills

NON-MANUFACTURING SPECIALS

	602	Asylums (<i>e. g.</i> , Deaf, Dumb, Blind, Orphan), Homes for Aged
	604	Asylums, Insane and Inebriate—Sanatoriums—Poor Farms—Almshouses
605	606	Barns and Stables (Public), Livery, Sale, 'Bus, Express, Hotel and Boarding
	608	Billiard Halls and Bowling Alleys
	610	Blacksmith Shops
	612	Boat and Bath Houses—Yacht and Rowing Clubs
613	614	Bottling Works for Beers, Mineral Waters and Soft Drinks
615		Bridges
617		Builders' Risks, Buildings in process of construction
619	620	Club Houses (City)—Y. M. C. A.—Y. W. C. A.—Gymnasiums
	622	Club Houses (Country)
	624	Coal and Wood Yards—Coal Trestles
	626	Cotton Compresses with Warehouses and Platforms if communicating therewith
	628	Cotton Yards and Platforms when not communicating with Compress
	630	Exhibition Buildings—Carousels—Rinks—Fair Grounds, Race Tracks, Ball Grounds, and Similar Amusement Properties
	632	Fruit Evaporators and Hop Kilns

BLDG.	CONTENTS
	634 Fruit Packing Houses (not Canning)
635	636 Garages (Public)
	638 Gas Works
639	640 Greenhouses (Commercial)
	642 Hay Presses and Barns
643	644 Hotels and Boarding Houses (all the year round)
	646 Hotels and Boarding Houses (Summer or Winter only)
	648 Ice Storage Houses
	650 Lumber Yards—Wholesale and Mill
	652 Lumber Yards—Retail
	654 Marble and Stone Yards with power and Mills (for Hand Shops, see Miscellaneous)
655	656 Miscellaneous (Non-Manufacturing Specials not otherwise classified)
657	658 Motion Picture Shows (for Theaters, see 680)
659	660 Paint Shops
661	662 Photographers
663	664 Plumbing, Gas Fitting, Locksmiths and Tin Shop
	666 Prisons, Penitentiaries, Jails, Reform Schools
667	668 Rag and Junk Stores
	670 Steam Railway Risks (excluding merchandise for other parties in Freight Houses)
	672 Steamers, Vessels, Tugs, Ferry Boats, Marine Dredges, Yachts—Shipping in port or laid up
	674 Stock Yards
	676 Stone Crushers
	678 Street Railway and Traction Properties, including Storage and Operating Houses (for Car-building Works, see 300; for Electric Light and Power Plants when specifically insured, see 416; for Amusement Properties, see 630)
679	680 Theaters and Opera Houses (with or without Motion Pictures) (for Motion Picture Shows, see 658)
	682 Tobacco Barns
	684 Water Works and Pumping Stations—Filtration Plants

MISCELLANEOUS

701	Cord-wood, Logs, Lumber and Bark in the Woods
702	Floaters
703	Grain growing in Fields
704	Hay and Grain in Stacks in Field
705	Floaters—Automobiles
706	Cotton (all classes, not otherwise provided for) including floaters

Rent, Lease, Use and Occupancy, Commissions and Profit Risks to be given the same numbers as the classes to which they apply.

AUTOMATIC-SPRINKLERED RISKS

Non-Hazardous

802	Miscellaneous—Non-hazardous
-----	-----------------------------

Mercantile

803	804 Agricultural Implements
805	806 Department Stores
807	808 Drugs, Chemicals and Medicines

BLDG.	CONTENTS
809	810 Dry Goods—Woolens—Carpets and Notions—Chinese and Japanese Goods
811	812 Furniture Stores
813	814 Groceries— <i>Wholesale only</i>
815	816 Hardware
817	818 Mercantile—Miscellaneous
819	820 Warehouses for Storage of Cotton
821	822 Warehouses for Storage of Tobacco
823	824 Warehouses for Storage of Hemp, Jute and other vegetable fibres except cotton
825	826 Warehouses (not specifically classified)

MANUFACTURING SPECIALS
Wood-Workers

WOOD-WORKING WITH IRON-WORKING AND PAINTING

- 842 Agricultural Implement Factories and other Factories having wood-working (principally hard) in conjunction with iron-work, painting, etc., such as Carriage, Bed Spring, Incubator, Refrigerator, Sewing Machine and Wringer Factories and Car Works

WOOD-WORKING WITH FINISHING

- 844 Carpenter and Cabinet Shops without power—Looking-glass and Picture Frame Factories—Cooper Shops, Chair, Pail, Tub, Tank, Bobbin, Ladder, Wooden Toy and other Woodenware Factories; Furniture, Piano, Organ, Graphophone, Rattan, Wooden Trunk, Casket and Billiard Table Factories—Clock Factories—if with wood-working

MISCELLANEOUS

- 846 Marine Railways, Ship Yards, Boat Building, Dry Docks, Match Factories, Miscellaneous Wood-workers (not otherwise herein provided for specifically)

WOOD-WORKING IN ROUGH

- 848 Molding—Turning—Wheel—Hub—Spoke and Spool Factories—Carpenter Shops (power), Planing Mills—Sash, Door, Blind and Wooden Box Factories—Dry Houses for Lumber; Saw Mills, Shingle, Stave, Lath, Veneer and Kindling Wood Mills—Excelsior Factories

METAL-WORKERS

- 852 Automobile Factories, Foundries for Iron, Brass, Type Work and Stoves—Furnaces—Rolling Mills; Hardware Factories for manufacturing Cutlery, Copper or Brassware, Axes, Tools, Nails, Tacks, Pins and Needles—also Clock Factories if no wood-working, Jewelry, Watch, Dental, Scientific and Surgical Instrument Factories; Machine Shops (with Foundries connected)—Boiler Shops, Nut and Bolt Works, Bicycle and Firearms Factories, Locomotive Works, Wire-working and Drawing; Machine Shops without Foundries; Miscellaneous Metal-workers not otherwise specified, Silver; Aluminum and Tableware Factories; Electro-plating; Stamping Works—Tin,

BLDG. CONTENTS

- Hollowware, Iron Bedstead, Gas Fixtures, Lamp and Iron Toy Factories—Japanneries
- 854 Bakeries—Macaroni Factories
- 856 Bleacheries, Dye and Print Works
- 858 Boot, Shoe, Slipper, Heel and Counter Factories
- 860 Celluloid and Celluloid Goods Factories
- 862 Cereal Mills—except Flour and Rice Mills
- 864 Chemical Works, all kinds
- 866 Clothing, Cap and Overall Factories (for Rubber Clothing, see 902); Collar, Cuff, Shirt, Corset, Waist and other White Goods Factories
- 868 Confectionery, Chocolate and Chewing Gum Factories
- 870 Cotton Mills (Thread and Fabric)—Linen and Flax Mills, Cotton Hosiery, when full process
- 872 Drug, Dyewood, Bark Extract and Licorice Mills
- 874 Flour Mills
- 876 Fur Hat, Fur Cutting, Forming and Dressing Mills
- 878 Grain Elevators and Warehouses, Terminal
- 880 Hemp and Jute Mills—Cordage and Bagging Factories
- 882 Knitting Mills, full process (mixed Stock), for clear bottom, see 870; for clear wool, see 914
- 884 Leather Goods Factories (except Boot and Shoe) such as Harness, Saddlery, Pocket-book, Glove, Bag, Leather Trunk, Whip, and Sporting Goods
- 886 Miscellaneous (Manufacturing Establishments operated with Machinery, not otherwise classified)
- 888 Oil Cloth, Oil Clothing, Shade Cloth, Linoleum and Corticene Factories
- 890 Oil Factories—Vegetable
- 892 Packing Houses, Slaughtering, Rendering, Oleomargarine, Lard, Candle, Crude Glycerine and Glue Works
- 894 Paint, Varnish, White Lead and Oil Color Works, Turpentine Refineries
- 896 Paper, Pulp, Leather Board and Straw Board Mills
- 898 Printing Establishments, Lithographers, Bookbinderies
- 900 Rice Mills
- 902 Rubber Mills, including manufacture of Rubber Goods and Clothing, also Rubber Reclaiming
- 904 Silk Mills
- 906 Tanneries and Leather-making of all kinds
- 908 Tobacco, Cigar, Cigarette and Snuff Factories, Tobacco Stemmeries, Prizeries and Rehandling Houses

AUTOMATIC-SPRINKLERED RISKS (Continued)

- 910 Waste and Shoddy Mills
- 912 Weaving Mills (Weaving and Knitting only of Cotton, Wool or Elastic Goods), Embroidery and Lace Curtain Factories
- 914 Woolen and Worsted Mills, full process (for Knitting Mills, full process, see 882)

Non-Manufacturing Specials

- 952 Garages (Public)
- 954 Miscellaneous (Non-manufacturing Specials not otherwise classified)
- 956 Street Railway and Traction Properties—For Car-building Works, see 842
- 958 Theaters and Opera Houses (with or without Motion Pictures)

LIST OF CAUSES OF FIRE

No.

- 1 Chimneys, Flues, Cupolas and Stacks, overheated or defective.
- 2 Conflagration.
- 3 Electricity (except Electric Irons and Similar Small Devices).
- 4 Explosions.
- 5 Exposure.
- 6 Fireworks, Fire Crackers, Balloons, etc.
- 7 Friction, Sparks occasioned by Running Machinery.
- 8 Gas—Natural and Artificial.
- 9 Hot Ashes and Coals—Open Fires.
- 10 Hot Grease, Oil, Tar, Wax, Asphalt, ignition of.
- 11 Hot Irons (including Electrical Devices).
- 12 Incendiarism.
- 13 Lightning—buildings rodde.
- 14 Lightning—buildings not rodde.
- 15 Matches—Smoking.
- 16 Miscellaneous—Cause known but not classified.
(For Unknown see No. 27.)
- 18 Open Lights.
- 19 Petroleum and its products.
- 20 Rubbish and Litter.
- 22 Sparks Arising from Combustion (other than 23).
- 23 Sparks on roofs.
- 24 Spontaneous Combustion.
- 25 Steam and Hot Water Pipes.
- 26 Stoves, Furnaces, Boilers and their Pipes.
- 27 Unknown.
- 28 Unknown origin, but investigation important.

Note—Losses assigned to 28 are to be promptly reported to the Bureau upon special blanks for the purpose.

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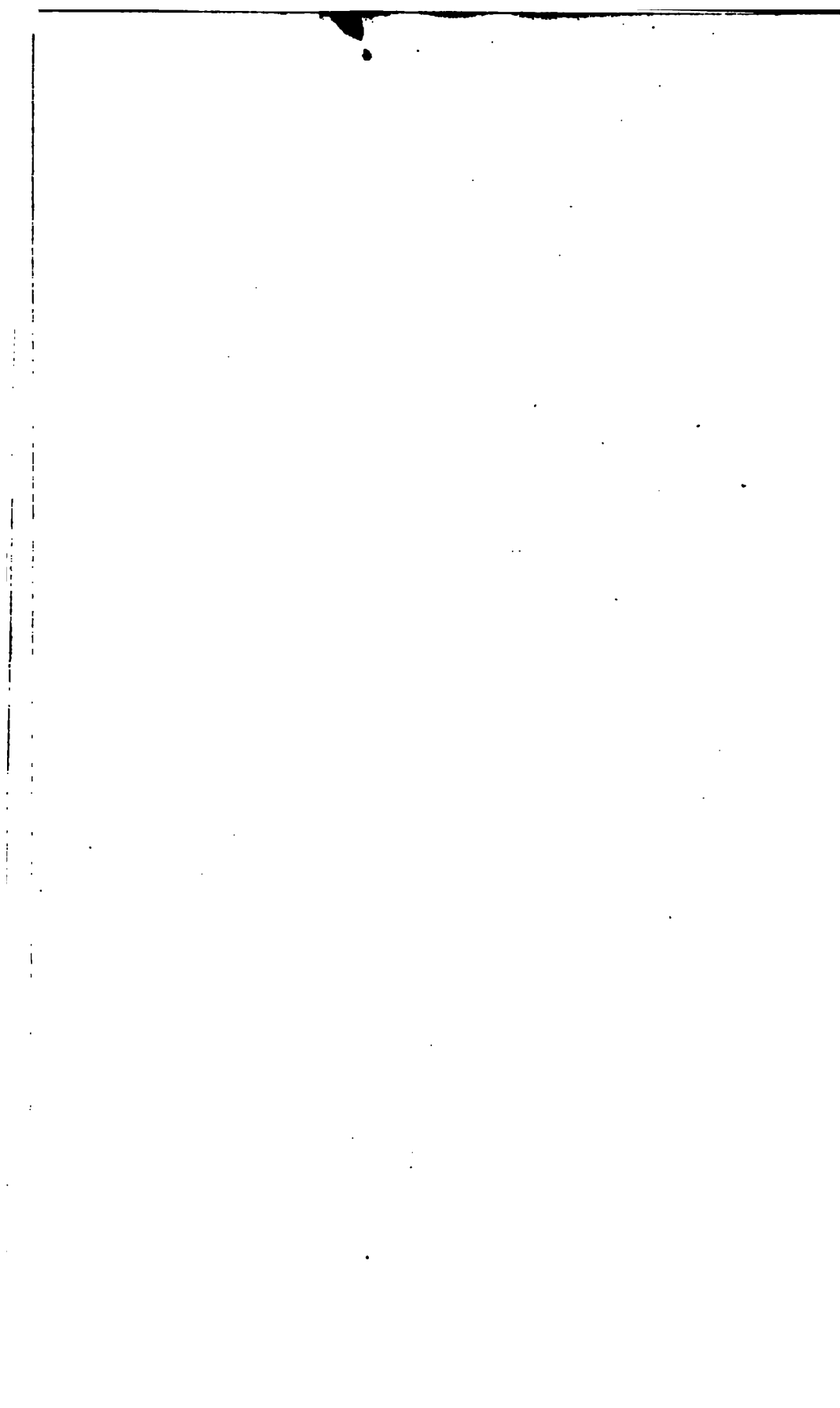
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